NETWORK WORLD

The Newsweekly of User Networking Strategies

Volume 7, Number 32 | An International Data Group Publication | August 6, 1990

Energy firm outsources DP, SNA net

By Wayne Eckerson
Senior Writer

ATLANTIC CITY, N.J. — Sun Refining and Marketing Co. last week announced it will hand over its data center and network operations to Andersen Consulting in a 10-year outsourcing deal worth $200 million.

Andersen will purchase and operate Sun Refining's data center in Dallas and hire the 70-plus employees who currently work there.

Andersen will also take over some assets, as well as management, of Sun Refining's IBM Systems Network Architecture net, which supports the firm's oil refineries, distribution sites, marketing offices and its corporate headquarters in Philadelphia.

Sun Refining joins a growing number of energy companies, including Chevron Corp., that are turning to outsourcing as a way to cut costs and reduce capital expenditures. In recent years, the industry has been hit hard by declining oil and gas prices.

The deal is one of the largest outsourcing agreements for which figures are known and is the biggest outsourcing contract Andersen has won to date. It establishes the consultancy's repu-

(continued on page 53)

RBHC CCS7 deployment

Percentage of access lines supported by Common Channel Signaling System 7-equipped switches

RBHC	1989 (Actual)	1990 (Projected)
Bell Atlantic Corp.	50.0%	56.4%
BellSouth Corp.	43.1	50.5
Pacific Telesis Group	14.9	17.3
Ameritech	13.6	18.7
Nynex Corp.	0.0	16.4
Southwestern Bell Corp.	0.0	13.3
US West, Inc.	0.0	10.8
Average total*	19.5%	28.2%

*Weighted average based on number of lines supported by each RBHC.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: NORTHERN BUSINESS INFORMATION, NEW YORK

Plodding CCS7 deployment delays advanced services

Industry chides RBHCs for stalling the installation of signaling networks needed for new services.

By Bob Brown
Senior Editor

The regional Bell holding companies are moving too slowly in deploying Common Channel Signaling System 7 (CCS7) to meet the advanced service needs of corporate customers, according to users and analysts.

Although the RBHCs started deploying CCS7 in the mid-1980s, they now collectively support only about a quarter of all local access lines from CCS7-equipped central office switches. And they are not expected to have CCS7 fully deployed until about the turn of the century.

Moreover, the RBHC CCS7 facilities currently installed are islands unto themselves: No RBHC has established CCS7 connections to the signaling networks of long-haul carriers, meaning users cannot get what they want most — wide-area, end-to-end intelligent network services.

But RBHC deployment of CCS7 is picking up steam.

The percentage of RBHC lines from CCS7-supported switches is expected to grow from 19.5% in 1989 to 28.2% this year, according to Susan Kalla, director of research at Northern Business In-

(continued on page 53)

Congress warns FCC against rapid change

House grills Sikes on LEC price caps, deregulation of AT&T; cautions against 'multibillion-dollar' errors.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Congress last week tried to put the brakes on proposed Federal Communications Commission regulatory changes, warning FCC Chairman Alfred Sikes not to rush ahead with plans to lessen regulation of AT&T and implement price caps for local exchange carriers.

At a hearing on Capitol Hill, members of the U.S. House Subcommittee on Telecommunications and Finance urged Sikes to move cautiously with the proposed regulatory changes, saying they could add up to "a multibillion-dollar mistake."

Until now, Sikes has enjoyed a cordial relationship with Congress. But last week's hearing was confrontational, with a majority of subcommittee members expressing concern about the way Sikes is handling major regulatory issues.

Some representatives questioned Sikes' willingness to listen to concerns about the policy changes.

Subcommittee Chairman Edward Markey (D-Mass.) last week asked Sikes to promise not to proceed with the proposed changes until he could prove that AT&T price cap regulation implemented last year is working.

He said an accounting of recent regulatory changes is an essential precondition to any further FCC actions. "Many fear that

(continued on page 53)

INSIDE

August 1990

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

The federal government's GOSIP era draws near.
See story, page 2.

DEC shares early lessons on DECnet V

Digital Equipment Corp. customers using DECnet Phase IV face a plethora of questions about migrating to DECnet Phase V, which is based on Open Systems Interconnection standards. Where can they turn for help?

Why not DEC itself? With one of the world's largest DECnets — supporting 54,000 nodes — DEC is facing many of the same questions and has set up a migration team to come up with some answers.

That team is headed by Robert McCauley, OSI migration manager with DEC's Strategic Technologies Group.

In a recent interview with *Network World* Senior Editor Jim Brown, McCauley shared some of the lessons DEC has learned in the early stages of its

(continued on page 52)

NETLINE

NETWARE FOR MAC gets support for Apple's latest net standards, including AppleTalk Phase II and the newest AppleTalk Filing Protocol. Page 2.

US SPRINT CUSTOMERS assail the carrier for billing problems and delaying the cutover to a new billing system. Page 2.

VAN CARRIERS OFFER flat-rate pricing in an attempt to lure private-line users. Page 4.

INDUSTRY DEBATES A BILL that would legalize caller ID services nationwide but would require a blocking option. Page 5.

OSF LAUNCHES A SEARCH for tools to be used in a distributed management environment. Page 5.

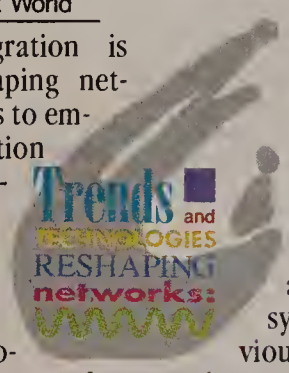
FCC DENIES AT&T's request to compensate customers of Tariff 15 for delays in installation. Page 6.

NEWSPAPER

FEATURE

Multimedia arrives at the networked desktop

By James Kobielus
Special to Network World



Multimedia integration is fundamentally reshaping networks, enabling users to embrace a new generation of more powerful applications that combine text, compact disc-quality audio, raster images, vector graphics and full-motion video — indeed, any information that can be represented electronically.

To support multimedia integration, users and vendors are bringing more sophisticated technologies to the desktop, including high-resolution displays, stereo sound and optical storage subsystems.

Meanwhile, developers are building applications that span systems that were previously separate — such as private branch exchanges and mainframes, or videoconferencing facilities and desktop presentation work-

(continued on page 30)

Government agencies prep nets for GOSIP compliance

GOSIP mandate takes effect Aug. 15; agencies say they expect early difficulties in migration.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The federal government will enter an era of open computer networking next week when its Government Open Systems Interconnection Profile (GOSIP) procurement mandate officially takes effect.

Beginning Aug. 15, purchasing officers at federal agencies will be permitted to buy only those network products conforming to Version 1 of the GOSIP specification as set forth by the National Institute of Standards and Technology (NIST).

Agency users said they expect early difficulties in migrating their multivendor networks to GOSIP but believe the transition will be facilitated by the fact that the government and vendors worked closely to develop the specification. They are also confident that vendors will have both the products and expertise to assist in the migration.

GOSIP is a collection of data communications standards drawn from a broad spectrum of standards developed by groups such as the International Standards Organization (ISO) and the Consultative Committee on International Telephony and Telegraphy.

Requiring conformance to GOSIP is intended to simplify the

(continued on page 54)

New NetWare for Mac ups performance and bridging

Version 2.0 supports latest Apple net standards.

By Susan Breidenbach
West Coast Bureau Chief

WALNUT CREEK, Calif. — Novell, Inc. last week announced a new release of its NetWare for Macintosh server software that includes support for Apple Computer, Inc.'s latest networking standards, AppleTalk Phase II and AppleTalk Filing Protocol Version 2.0.

NetWare for Macintosh 2.0 offers better performance and has additional Macintosh-based utilities that permit more administrative tasks to be performed from Macintosh workstations. The new release also offers improved bridging to a NetWare 386 server.

Like its predecessor, NetWare for Macintosh 2.0 runs in a NetWare 2.15 server as a server-based application that Novell calls a value-added process. It makes the NetWare server look like an AppleShare server to the Macintosh clients, enabling them to store and share files on the NetWare server and to use NetWare printing and other services, all from within the familiar Macintosh graphical user interface.

"This update keeps pace with recent advances in Apple's AppleTalk and AppleShare standards,

(continued on page 54)

Users criticize US Sprint for continued billing problems

By Bob Wallace
Senior Editor

KANSAS CITY, Mo. — Top US Sprint Communications Co. customers last week criticized the carrier for recurring problems with its billing system and for delaying migration to its new Invoice Processing System (IPS).

In trying to convert customers to the advanced billing system, a process that has been delayed by nearly half a year, the carrier has been accused of paying less attention to its current billing system, which they say is still producing late and inaccurate bills.

Brent Bragg, telecommunications director for Owens & Minor, Inc., a pharmaceutical supplier in Norfolk, Va., said US Sprint has misbilled his company on several occasions during the last 18 months, but he stressed that the carrier has given credits in each instance.

Bragg said US Sprint is trying to bill some company sites for calls made two or three years ago, and the company is working with the carrier to resolve the problem. He added that the company used US Sprint for the lion's share of its long-distance services but became so aggravated over billing that it has handed over most of its business to MCI Communications Corp., retaining only its US Sprint 800 lines.

"It doesn't matter what you're saving [by using US Sprint] if you

(continued on page 8)

Briefs

Cutting the lines that bind. Nynex Mobile Communications Co., a subsidiary of Nynex Corp., last week announced that it plans to introduce the nation's first wireless personal communications network in New York late next year. The network, which will cost at least $100 million to build, would enable the company to offer telephone service to pedestrians carrying portable handsets. The wireless network would offer up to 20 times the call-handling capacity of existing cellular systems.

Wireless LANs get some respect. The Institute of Electrical and Electronics Engineers, Inc. recently formed a new working group for its 802 Committee that will develop a standard for wireless local-area networks. The P802.11 Working Group's first meeting will be held in Oshawa, Ontario, this September. The group was spawned by the 802.4 Working Group, which began examining wireless communications as part of its work to develop standards for token-bus LANs. P802.11 hopes to have a draft standard ready by mid-1991. The standard will define how devices can exchange data without wires and will probably support speeds in the 1M to 20M bit/sec range. The group will initially examine radio transmitters that support spread-spectrum technology but may also examine infrared and other light-wave technologies.

Net pact concluded with Japan. The U.S. last week announced the completion of an agreement with Japan that will make it easier for U.S. companies to run dedicated voice and data circuits into the country, ease restrictions on international value-added networks (IVAN) and make it possible for users to buy certain kinds of equipment directly from U.S. suppliers rather than local carriers. On the private network side, Japan agreed to let foreign companies build international private-line networks carrying voice and data traffic to and from Japanese affiliates in which they own at least a 10% stake, or between business partners that do at least 20% of their business with each other. Previously, private nets could only be used by individual international companies.

Japan also agreed to let users dump voice traffic from international circuits into the public switched network. Additionally, Japan agreed to reduce surcharges by 20% on leased circuits used by IVANs, to speed regulatory approvals for IVANs and to let equipment vendors sell network channel terminating equipment, which includes data service unit/channel service units, directly to users.

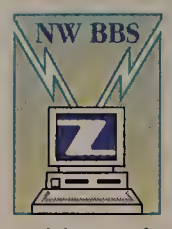
Kuwaiti invasion blocks net traffic. Iraq's invasion of Kuwait last week has blocked virtually all telephone calls to the two countries. According to an AT&T spokesman, 98% of all calls to Kuwait last Thursday were being blocked because of high calling volumes. The 24,000 call attempts per hour overwhelmed the carrier's 100 voice circuits to the country. The spokesman added that on Friday at 8:30 a.m., most of the Kuwaiti circuits were out of commission for an undetermined reason. Nearly all of the 100 voice circuits to Iraq were knocked out at 10:30 a.m. on Thursday.

Commodities trading halted. Futures trading at five New York commodities exchanges was halted for almost an hour last Tuesday after an AT&T technician working in the carrier's Thomas Street central office mistakenly disconnected a live analog private line serving Commodities Exchange Center, Inc. (CEC). CEC General Manager James Neal said the company uses the line to transmit price reporting data to AT&T, which delivers the information to price quote vendors including Automatic Data Processing, Inc., Quotron Systems, Inc. and Reuters Informations Services, Inc. Those companies, in turn, send the information to brokerages.

"It was a traumatic situation for all parties," Neal said. "Iraq was at Kuwait's borders, there was much activity with oil, and right in the middle of this, everyone had to stop trading for a half hour." The lines were down from 11:03 a.m. to 11:42 a.m. Eastern Standard Time, and traffic was halted again at 11:52 a.m. but resumed about seven minutes later, Neal said. Two more outages, one lasting two minutes and the second lasting one minute, took place in the next half hour.

An AT&T spokesman said the worker was performing routine maintenance in the central office and was working with predivestiture records that showed the line as inactive. The spokesman said the company did not know why the line went down three times in the following hour.

CONTENTS

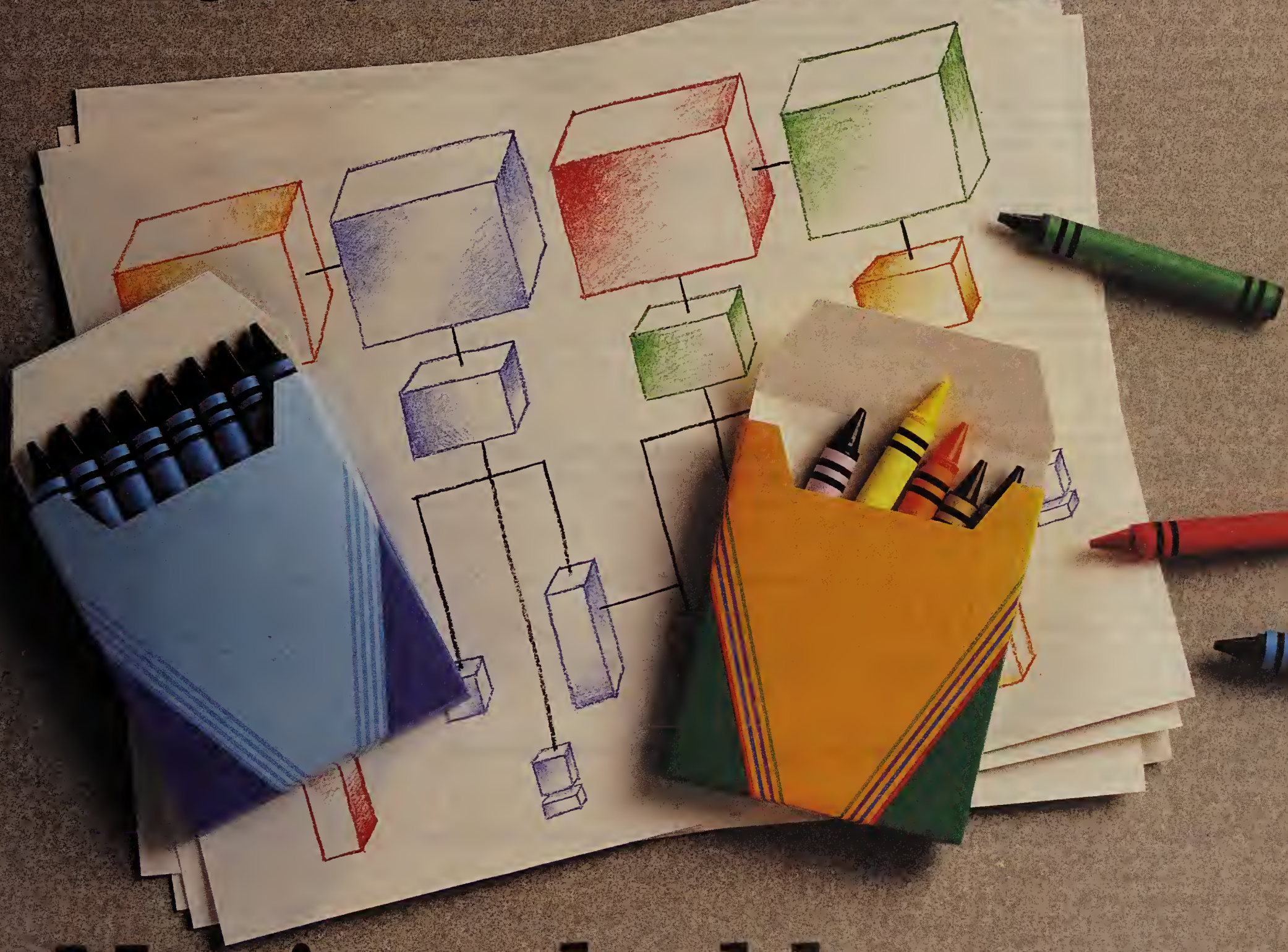


NW Bulletin Board Contact us electronically. Our BBS lets you submit letters to the editor, pass on tips and leave change of address requests. It also supports a forum you can use to interact with other readers.

You can use any IBM, Apple or other microcomputer to dial into the BBS at (508) 620-1160, (508) 620-1160 (300 to 2,400 bit/sec), or (508) 620-1178 (speeds up to 9.6K bit/sec). You can also reach us in person by calling (800) 622-1108.

Article reprints (minimum 500 copies) can be obtained from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9171

Systems and network management for the real world.



Not just the blue one.

The all-blue information environment is a thing of the past.
The challenge today is to keep information flowing throughout a full range
of environments that mirror your organization's needs.
Systems Center's integrated software products, multi-platform technology,
and hardware-independent approach enhance your control over information resources
while helping you take advantage of the best possible systems management options.
To find out more, write or call Systems Center, Inc.
1800 Alexander Bell Drive, Reston, Virginia 22091 (800) 533-5128.

SYSTEMS CENTER

See The FAXNeT Form on Page #17

VAN providers adopting flat rates in effort to lure private net users

Users weigh alternative to private nets, usage-based pricing.

By Barton Crockett
Senior Editor

In an attempt to make their services a more viable alternative to private lines, packet network carriers are deploying new flat-rate pricing plans that could encourage users to reevaluate their use of leased lines.

Flat-rate pricing represents a departure for value-added network (VAN) carriers, which have traditionally charged customers for the volume of data transmitted.

One VAN adopting flat-rate pricing is Infonet Services Corp., which last month introduced a new family of offerings called Virtual Private Data Networks (VPDN) that includes flat-rate billing for packet-switched traffic ("Infonet to offer flexible service pack," *NW,* July 30).

This introduction follows an announcement earlier this summer of a BT Tymnet, Inc. service called XLink Express that carries a flat monthly fee for the transmission of virtually unlimited data between multiple remote devices and a central host. BT Tymnet plans to introduce other flat-rate pricing plans this fall as part of a larger international service announcement, according to company officials.

Both firms trail US Sprint Communications Co.'s packet network division, Sprint Data Group, which in 1988 began offering users the option of avoiding data volume charges on dial-up access to SprintNet.

Since then, Sprint Data Group has also let users pay flat monthly fees for dedicated connections and has introduced flat-rate services targeted as direct replacements for private lines in specific computing environments.

Among these services is Multidrop Plus, in which the carrier uses the SprintNet network to replace a multidrop line for communications from multiple remote terminals to a central host.

Reevaluating nets

As these new services debut, users are reevaluating use of private-line and public packet-switching facilities.

Among the companies making this reevaluation is Storage Technology Corp., a manufacturer of computer data storage products in Louisville, Colo., and one of the first users of Infonet's VPDN package.

Storage Technology uses VPDN to handle communications of inventory, repair and customer service information from remote minicomputers at 11 locations in Asia, Australia and Europe to its central corporate host in Louisville.

Frank Catalfamo, manager of corporate telecommunications at the firm, said that by using VPDN, Storage Technology trimmed its monthly $65,000-to-$70,000 packet-switching bill from Infonet by $20,000.

In addition, Catalfamo said he knows exactly what his monthly bill will be and no longer faces variations of $10,000 to $20,000 per month because of changes in data volumes.

He added that the company had considered building an international private-line network but concluded that doing so would have required adding two more staffers than are needed with the Infonet services. Catalfamo said Storage Technology likes the idea of off-loading to a third party the responsibility of wrestling with time zone and regulatory difficulties inherent in operating an international net.

Ray Pardo, chief telecommunications engineer at the Gaithersburg, Md., office of Bechtel Corp., a construction firm in San Francisco, said flat-rate pricing plans could lead his firm to reevaluate its use of private-line facilities.

"This sounds very attractive," Pardo said. "There are administrative aspects to private networks that are very difficult to manage, and [it] would be nice to off-load to a public solution."

Some problems

But as VANs begin to target their services as replacements for private lines more aggressively, some observers warn that their performance may not live up to user expectations.

James Bailie, manager of international telecommunications at United Technologies Corp., said he would be concerned about VANs not being able to deliver net management capabilities equal to those available with private nets.

Leonard Elfenbein, president of Lynx Technologies, Inc., an international communications consultancy in Little Falls, N.J., warned that users opting for VAN packet services might lose out on possible cost savings derived from lumping voice and data traffic together on private lines.

He and Catalfamo also cautioned that network response times on public data networks are typically slower than on private networks.

But Berge Ayvazian, vice-president for communications research at The Yankee Group, a research firm in Boston, countered by arguing that as users increasingly dump voice traffic onto virtual networks, the economic case for keeping data traffic on private lines is diminishing. That, he said, will cause more users to look to flat-rate services such as VPDN for data communications.

Industry, Senate argue merits of bill that would legalize caller ID

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — In debates during a Senate hearing last week on caller identification and automatic number identification (ANI), the issues of privacy and call blocking left the telephone industry divided.

Sen. Herbert Kohl's (D-Wis.) bill, the subject of the debate, would legalize calling party ID services nationwide but would also require service providers to offer call blocking. At the hearing, AT&T and New Jersey Bell Telephone Co. objected to call blocking, while Centel Corp. and Pacific Bell said they already had plans to offer call blocking for free.

Kohl's "Telephone Privacy Act of 1990" would amend 1986 wiretap laws, which prohibit unauthorized call-tracing activity, in order to make caller ID and ANI unequivocally legal under federal law. But Kohl wants a call-blocking mechanism to be available to callers should they want to shield their identities. "Forced caller ID violates our right to privacy," he said.

The hearing marked the first time AT&T has spoken out publicly on the call-blocking issue. Carol Knauff, AT&T director of intelligent network services, said mandating nationwide blocking capability would be premature and unwise.

AT&T said caller ID services cut down on the number of obscene and harassing calls, and argued that call blocking would reduce customers' ability to screen unwanted calls. In his testimony, James Cullen, president of New Jersey Bell, also objected to the provision of call blocking, leaning strongly on the obscene phone caller argument.

Both AT&T and New Jersey Bell said it was too early in the development of caller ID services to institute a federal law. It would be better to let the states work out their own solutions, and that experience would show which direction was best, the carriers said.

In contrast, John Stangland, assistant vice-president of product development and management at Pacific Bell, said blocking is "a balanced approach." He said his company would comply with a new California law requiring free call blocking.

Ed Leftwich, chairman of Centel, said his company had just filed a request with the Nevada Public Service Commission to offer Calling Number ID and had proposed to offer per-call blocking for free.

Although the subject of obscene phone calls dominated the hearing, AT&T did speak out on business concerns.

Knauff asked Kohl to exempt business services from the blocking requirement in his bill. According to Knauff, blocking would impede the provisioning of services such as AT&T's Integrated Services Digital Network-based Info-2 service, which enables customers of its 800 and 900 services to identify callers.

Kohl expressed a willingness to consider treating 800 and 900 services differently as Congress moves forward with the legislation. A similar bill to the Kohl bill has been introduced in the House by Rep. Robert Kastenmaier (D-Wis.).

OSF seeks open systems-based mgmt. tool set

By Bob Brown
Senior Editor

CAMBRIDGE, Mass. — The Open Software Foundation (OSF) last week issued a request for technology (RFT) for an open systems-based distributed management architecture and a set of accompanying management applications.

The goal of OSF's Distributed Management Environment (DME) effort is to come up with a single set of tools with which users can easily and cost-effectively manage networks, computer systems and applications.

DME would provide a management framework defining relationships between controlled objects, common management services and management applications. It would enable users to handle network management and systems administration tasks such as software distribution and backup, as well as restoration of distributed computer systems from a central site.

Potential technology submissions for the framework include IBM's NetView, Digital Equipment Corp.'s Enterprise Management Architecture, Hewlett-Packard Co.'s OpenView, AT&T's Unified Network Management Architecture and the Open Systems Interconnection/Network Management Forum's network management specifications, among others, according to OSF officials and members.

It's likely that a mix of these and other vendors' net management technologies will be selected and woven into the OSF offering, said Ken Chapman, chairman of OSF's Management Special Interest Group and principal software engineer for DEC's network management products.

Peter Schay, vice-president of small computer systems at Gartner Group, Inc., a Stamford, Conn.-based market research

(continued on page 54)

FCC pans AT&T plan to give users discounts for Tariff 15 setbacks

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The Federal Communications Commission last week shot down AT&T's efforts to compensate two users for lost discounts due to delays in implementing their Tariff 15 networks.

AT&T had asked the FCC for permission to give CBS, Inc. and La Quinta Motor Inns, Inc. a onetime credit on their first bills if the carrier fails to hit target installation dates.

The credit would be calculated by taking the percentage discount AT&T offered in the Tariff 15 deal, multiplying it by the number of months the offer was delayed and reducing the first Tariff 15 service bill by that percentage. For example, a user with a 10% discount whose service was delayed by 3 months would receive a 30% discount off the first month's bill.

Customers would also be allowed to shorten the term of their deals by the number of months service was delayed.

Last week, the FCC said such an arrangement was unlawful and told AT&T it could not offer the credit. The agency rejected the credit plan because it said AT&T failed to provide information on how the credits and the possibility of shorter contract lengths would impact the financial viability of the deals.

In all tariff filings, AT&T must show that a service will pay for itself within a certain period. This rule is designed to prevent cross-subsidies between services.

"Once again, we and the customer have been thwarted by the regulatory process. We are still assessing the best course of action for the customer and as yet have not determined whether it would be proper to refile or file new information [on the credit plan]," an AT&T spokeswoman said.

AT&T has also proposed similar credits in its other Tariff 15 deals, but the FCC has not yet issued a decision on the offers. Those deals are for Resorts Condominium International, Inc., PepsiCo, Inc., The Original Cookie Co. and Schwan's Sales Enterprises, Inc. Another Tariff 15 arrangement is being offered to three separate customers — The East Ohio Gas Co., Swift Global Communications, Inc. and Overseas Military Sales Group.

According to AT&T officials, the ability to compensate users for regulatory delays is vital to their survival in the corporate account market. If AT&T can't offer compensation, users will be unwilling to accept a Tariff 15 deal because they may lose out on discounts during the period in which the FCC scrutinizes the deal. Rival carriers would be able to start giving discounts immediately since they don't have to wait for regulatory approval, AT&T said.

Although AT&T said it would compensate users for delays of any sort, the plan is clearly designed to insulate customers from such regulatory delays.

(continued on page 54)

Sparks fly at debate about U.S. public net

By Barton Crockett
Senior Editor

NEW YORK — Heated exchanges lit up the night at a public forum here last week where leading experts debated the international competitiveness of America's public network.

William Davidson, associate professor of international business at the University of Southern California, faced off against Lee Selwyn, president of Economics and Technology, Inc., a Boston-based consultancy, in a public debate about the quality of the U.S. network and its impact on the competitiveness of American industry.

The event, hosted by Columbia University's Business School and the Center for Telecommunications and Information Studies, presented a rare opportunity for leading figures in the debate over the quality of the U.S. net to square off in person, rather than through briefs or the media.

Davidson, who heads Mesa, Inc., a carrier and computer consultancy in Los Angeles, has helped prepare most of the research used by regional Bell holding companies to argue that this country's public network is becoming second rate by failing to match foreign carrier investments in such new technologies as digital switching and Integrated Services Digital Networks.

Selwyn, whose firm has prepared most of the research disputing Davidson's claims, has been supported in his efforts by such users groups as the International Communications Association and the Consumer Federation of America. Both individuals have filed numerous reports on the subject with government agencies, including the National Telecommunications and Information Administration, which is now preparing a study on the quality of the U.S. network infrastructure.

Davidson kicked off the evening with a somber presentation of data that he said proves "the level of network modernization in the U.S. is falling dramatically behind other countries."

(continued on page 8)

"I INVEST IN INTEROP 90 FOR A WEEK AND GET DIVIDENDS ALL YEAR. IN A FEW BUSY DAYS, I GET MORE THAN A BAG FULL OF LITERATURE—I WALK AWAY WITH KNOWLEDGE I CAN USE TO ENHANCE MY NETWORK."

If you're looking for a smart investment that will put you ahead, we're it. Whether you've got hands-on network responsibilities or you supervise a range of MIS functions, INTEROP 90 is the right place to be. □ INTEROP 90 is our industry's most comprehensive conference in multivendor network computing and interoperability. It is still the industry's only hands-on exhibition where all exhibitors must connect to and interoperate on the show network. □ But you won't just look at new products – you'll also learn. With over 20 in-depth tutorials and 45 conference sessions covering Network Management, PC/LANs, SNA to TCP/IP, ISDN, High-Speed Networking, OSI/GOSIP, and Distributed Databases, INTEROP 90 gives you information that will deliver bottom-line benefits all year long. □ Test the products of 175 exhibitors at our exclusive Solutions Showcase™ Demonstrations – the proof you need to make informed buying decisions. Exhibitors include IBM, Sun Microsystems, DEC, Novell, Apple, 3Com, AT&T, SynOptics, and Network Systems. For complete program details and registration information call Interop, Inc. now.

INTEROP® 90

Real-World Solutions for Today's Networks

INTEROP 90®

Phone or Fax Us Now! **1-800-INTEROP** Ext. 27 Fax 415 949-1779

5th Interoperability Conference & Exhibition October 8-12, 1990 San Jose Convention & Cultural Center San Jose, California

See The FAXNeT Form on Page #17

Users chide US Sprint for billing problems

continued from page 2

can't get an accurate bill," he added.

John Morrison, voice information services vice-president for Sears Technology Services, Inc. (STS), said, "US Sprint has failed to keep its current billing system up to date for new products and technologies in anything other than a patchwork way."

STS is the Schaumberg, Ill.-based information technology arm of Sears Roebuck and Co. According to Morrison, an officer of the 500-member US Sprint National Accounts Users Association, Sears is one of US Sprint's three largest customers.

"They knew IPS would replace their current system, so they didn't spend a great deal of time and resources on the [existing] one," Morrison added.

Patrick Cohen, a telecommunications specialist with W.R. Grace & Co., a chemical firm in New York, said the carrier promised to bill his company for Virtual Private Network (VPN) service using a format developed by the user. But the carrier has reneged on the deal, and W.R. Grace is getting the standard VPN billing format.

"Their attitude is, 'You're getting a bill on time; you should be happy,' " he said.

US Sprint has also failed to live up to its promise to bill on a per-site basis for VPN's route advance feature. Instead, the carrier is giving W.R. Grace's headquarters a single bill for all sites using the feature.

In addition to billing problems, users are concerned about delays in migrating to IPS. Originally, senior US Sprint officials said major users would be migrated to IPS by March 1991. But at its National Accounts Users Association meeting in April, the carrier said that schedule has been pushed back four to five months.

"[IPS] was not completely ready for customers," a US Sprint spokesman said last week. "It was not up to internal quality specifications."

Announced in February, IPS will provide customers with a single bill for all services, as well as custom management reports and on-line access to traffic data. Analysts said IPS will enable the carrier to establish a unified volume discount plan covering all services and give it an edge over rivals AT&T and MCI.

"We would like to get IPS in the marketplace as quickly as we can and get the new capabilities in our customers' hands. But we want a high level of assurance that all the groundwork has been laid," US Sprint President Ron LeMay told *Network World* last week.

He said the carrier completed conversion of residential subscribers to IPS in May. "We are in the process of rolling [out] IPS to the middle and upper parts of the market," LeMay said. "We will be managing this process carefully because billing is important but aggressively because it will give us a competitive advantage."

Curtis Peterson, chairman of the US Sprint users group's billing subcommittee, said he and other users group representatives will meet with US Sprint's top billing staff later this month for a progress report on IPS.

"We'll be meeting with them to find out exactly what is going on with IPS," said Peterson, who is also telecommunications director for Matrixx Marketing, Inc., a telemarketing service bureau in Ogden, Utah.

But even though US Sprint is talking, Peterson and STS' Morrison said the delays are a cause for concern. "IPS is exciting and can offer companies a real advantage in tracking and managing expenses," Morrison said. "That's why it's frustrating that it's being delayed."

Sparks fly at debate about U.S. public net

continued from page 6

For example, Davidson said that although the U.S. is now the third leading country in deployment of local access lines supported by digital central office switches, it is expected to rank 12th by 1994.

Davidson added that total network investment in this country per access line is declining. He said other countries, such as Japan and West Germany, spend nearly twice as much as U.S. carriers and are increasing their expenditures. He claimed that U.S. deployment of Integrated Services Digital Network capabilities lags dismally.

Davidson said ISDN is now supported on only 4.5% of all U.S. local access lines, while France and Singapore will support the technology on 100% of their access lines in 1991 and Japan will support it on 82% of its access lines in the same year.

"The trends are deeply disturbing," he said. "In virtually every area, the U.S. has lost or is rapidly losing its lead."

Selwyn countered that Davidson is "full of smoke" and took exception with nearly every one of his assertions. For example, Selwyn said Davidson's assessments fail to note that service options such as inexpensive, reliable private nets exist in the U.S. but are not available in other countries.

He said per-capita network usage in the U.S. dwarfs usage in other countries and foreign carriers are now struggling to build up the usage volumes and economies of scale enjoyed by U.S. carriers.

Selwyn said Davidson is a paid consultant for the RBHCs who propagates a viewpoint opposed by every party in the communications industry except his clients. He cautioned that the U.S. needs to upgrade other infrastructures such as its roads and education system before investing more money into the public net.

"I somehow think that the risk of the U.S. losing its position internationally because of our intolerable education system is a little bit more serious than the penetration level of ISDN," he said.

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"By removing a government-imposed barrier to entry, we believe the bill will promote competition in the delivery of video services and provide incentives for more rapid technological development of our nation's telecommunications infrastructure."

Thomas Sugrue
Deputy assistant secretary for communications and information
Department of Commerce
Regarding a bill that would let telephone companies enter the cable television business.

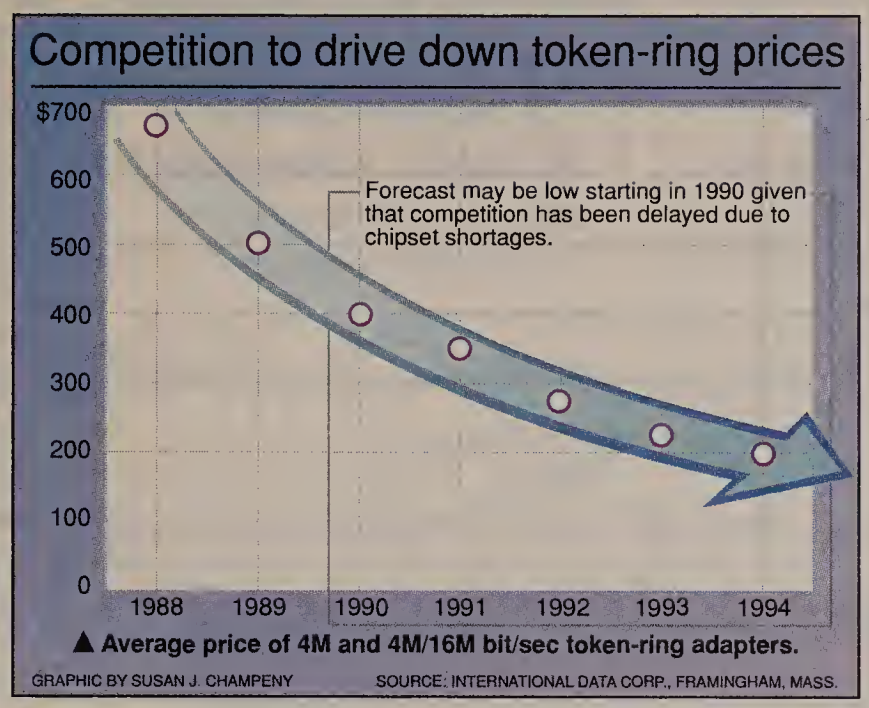
People & Positions

Network Management, Inc. (NMI), a Fairfax, Va., systems integrator, last week announced a corporate restructuring and several new senior management appointments.

NMI has combined a core group of operating companies it has acquired since its founding in 1986 into four new business units: national sales and marketing, national customer service, new programs and advanced systems.

Howard Frank, NMI's chairman and chief executive officer, relinquished the title of president with the naming of **Douglas Davidson** as president and chief operating officer. Davidson, who recently joined the company as vice-chairman, previously was executive vice-president of Science Management Corp.

In addition, **Pierre Forestier** was named vice-president for national customer service. **Peter Kraus** was promoted to vice-president of advanced systems. **Carl Patrick** was promoted to vice-president of the new programs unit, and **Carmen Randazzo** was named vice-president of operations.



Users to see more 16M adapter options

Third parties will pump out bevy of wares once TI starts volume shipments of token-ring chipset.

By Bob Brown
Senior Editor

In the next year or so, users will likely enjoy a wider array of 4M/16M bit/sec token-ring adapter cards — as well as lower adapter prices — if Texas Instruments, Inc. begins volume shipments of its 4M/16M token-ring chipset this fall as expected.

Volume shipments of the chipset, which are overdue by about a year, would enable third-party adapter manufacturers to bring new products to market. This would give users a choice beyond IBM, Proteon, Inc. and Madge Networks, Ltd., which offers a 4M/16M adapter that was recently pulled off the market due to performance problems.

According to most industry watchers, third-party developers will crowd the market with new 4M/16M bit/sec token-ring adapters and related products, such as network analyzers, during the next 18 months. Price competition should heat up in the next year or so as the new players establish their distribution channels.

But those could be optimistic estimates if there are problems with the TI chipset, as Madge Networks officials claimed after the recall of their company's 4M/16M token-ring cards ("Madge Networks recalls faulty token-ring adapters," *NW,* July 2). Madge Networks' problems could make vendors wary of offering adapters before significant further testing is conducted.

"It's pretty hard to forecast anything in this market with the delays and everything else that's happened so far," said Susan Frankel, research analyst for the LAN Program at International Data Corp., a Framingham, Mass.-based market research firm. "Unfortunately, that's what vendors and users are up against."

Originally, TI expected to deliver its 4M/16M bit/sec token-ring chipsets in volume about a year ago, but production problems delayed the company's rollout schedule ("Chip scarcity may affect LAN adapter," *NW,* Jan. 15). Just two weeks ago, TI said an earthquake in the Philippines shook up one of its chipset packaging plants and created minor

"It's pretty hard to forecast anything in this market with the delays and everything else."

▲▲▲

delays in shipments as the company transferred packaging of chipsets to a subcontractor.

As a result of TI's 4M/16M bit/sec token-ring chipset woes, vendors that planned to offer adapters based on the chipset have had to either wait or find other options. Among the companies that have chosen other options are Proteon, which is making its own chipsets, and Network General Corp., which is buying 4M/16M bit/sec boards from IBM, which makes its own chipsets.

"The waiting has been tough

(continued on page 10)

Metro net product maker to resell Proteon routers

QPSX will use routers to link local nets to MANs.

By Laura DiDio
Senior Editor

WESTBOROUGH, Mass. — Proteon, Inc. and QPSX Communications, Ltd., a manufacturer of products used in high-speed metropolitan-area networks, have entered into a reseller agreement under which QPSX will sell Proteon routers that can be used to link local-area networks to metropolitan nets.

While metropolitan-area network services are not expected to be widely available until mid-1991, Bell Atlantic Corp. is field-testing in Philadelphia a prototype IEEE 802.6-compliant metropolitan net that uses QPSX equipment, according to Achilles Perdikaris, QPSX's executive vice-president of operations.

The current 802.6 standard supports speeds of 45M bit/sec, but there is a proposal before the IEEE 802.6 committee to increase transmission speed to 150M bit/sec. One of the primary applications of metropolitan-area network services will be to link LANs at multiple user sites.

Under the terms of the agreement, QPSX will incorporate Proteon's p4200 Multi-Protocol Router into QPSX's 802.6 product, which will be sold to carriers around the world. The carriers will provide the router to users as part of a service package.

Initial users of 802.6 metropolitan nets are expected to be large hospitals, banks, brokerage firms and engineering companies with high-volume data transmission requirements for applications such as medical imaging, financial processing and computer-aided design and manufacturing.

"A hospital could use a MAN to send X-ray images in minutes instead of hours."

▲▲▲

"A hospital that is unable to afford a private fiber network could, for example, use an 802.6 MAN to send medical images of X rays in minutes instead of hours," Perdikaris said.

(continued on page 10)

INDUSTRY BRIEFS

Netrix Corp., a manufacturer of hybrid packet/circuit switches, recently announced that it has raised $7.7 million in new venture capital financing, which it will use to fund future product offerings and growth in Europe and the Far East.

Netrix said the new investors are the U.S./U.K. investment group **Berkeley International Corp.,** the West German **Matuska Venture Partners** and Japan's **JAFCO.**

A spokeswoman said part of the funding would be used to develop frame relay support for the company's Netrix #1-Integrated Switching System.

Netrix said it is also seeking distributors in Japan.

Compression Labs, Inc. (CLI) last week announced that it has signed a $2 million contract with Australia's telephone administration, **Telecom Australia,** to provide videoconferencing equipment to be installed in public videoconferencing rooms and for the administration's internal use.

Telecom Australia purchased both the high- and low-bandwidth coder/decoders (codec) made by CLI, as well as CLI's new Multipoint Control Unit, which permits videoconferencing among eight sites simultaneously.

The CLI Rembrandt II/06 video codec, which operates at speeds ranging from 56K to 386K bit/sec, will be used on Australia's ISDN network. The CLI Rembrandt, which operates at 386K to 3M bit/sec, will be installed in Australia's public videoconferencing rooms, whose network operates at 2M bit/sec.

Fujitsu, Ltd. and **International Computers, Ltd. (ICL)**

(continued on page 10)

Users to see more 16M adapter options

continued from page 9

on users and vendors, but I don't expect to see either vendors or users throwing in the towel on 16M bit/sec token ring just yet," Frankel said.

In the interim, IBM has grabbed more than 90% of the 4M/16M market, analysts said. In fact, IBM had to triple its output of 4M/16M bit/sec token-ring boards during the last year to meet demand, which outstripped supply until recently, an IBM spokesman said.

But three to four months after TI starts shipping its 16M bit/sec token-ring chips in volume, third-party developers are expected to start providing IBM with some competition. Third-party developers planning to participate in the market include Hughes LAN Systems, Olicom and Racore Computer Products, Inc.

Len Palmer, director of marketing for desktop products at Hughes LAN Systems, said his company hopes to upgrade an existing 4M bit/sec token-ring adapter to support 16M bit/sec early next year.

"It's been frustrating to see IBM gain a monopoly position," Palmer said. "The market is obviously there, but we just can't make the products available. We're looking forward to participating."

Currently, IBM is selling its 4M/16M bit/sec token-ring adapters for $921 — after a recent price hike — a price tag that observers said will shrink once IBM gets some competition.

"We'll definitely see a price war," Frankel said (see graphic, page 9). "But it's going to be more than a year before prices really start to drop."

> "It's been frustrating to see IBM gain a monopoly position," said Hughes LAN Systems' Palmer.
>
> ▲▲▲

Ironically, the TI chipset saga could turn out to benefit users in several ways, said Colin Mick, executive director of the Open Token Foundation, an industry organization.

For one, TI's problems may have prompted other semiconductor makers to develop 16M bit/sec token-ring chipsets. Toshiba America Corp. and Western Digital Corp. are among those expected to join the fray, though delivery schedules have not been made public yet. Price competition here could lower costs for board developers, resulting in lower prices to customers, Mick said.

Another benefit is that the chipsets will be so thoroughly tested in light of Madge Networks' problems that users may wind up with more robust products, Mick said.

Metro net maker to resell routers

continued from page 9

The forthcoming QPSX/Proteon 802.6 metropolitan-area network offering, due out sometime in 1991, consists of three components, Perdikaris said. They include a central office switch, a Customer Cluster hub device and a separate network management station.

All of the components will be manufactured and sold by Alcatel N.A., Inc. and Siemens Public Switching Systems, Inc. under a licensing agreement with QPSX, Perdikaris said.

The Customer Cluster device provides the on-premises link to the carrier's metropolitan-area network service. It will be linked to the Proteon p4200 router, which will support a user's LANs, including 10M bit/sec Ethernets, 4M and 16M token-ring networks and 100M bit/sec Fiber Distributed Data Interface nets, according to Diane Rahe, Proteon's product manager for internetworking products.

The QPSX Customer Cluster hub device will be linked to the central office switching system via 45M bit/sec DS3 links, Perdikaris said.

The Proteon p4200 will give LAN users an extra degree of network management capability since the router contains built-in support for the Simple Network Management Protocol, Rahe said.

The third component of the QPSX metropolitan net is the network management center, implemented on a Tandem Computer, Inc. CLX fault-tolerant minicomputer running QPSX's net management software, which will comply with the evolving Open Systems Interconnection standard.

Pricing for the QPSX/Proteon 802.6 has not yet been set.

Industry Briefs

continued from page 9

last week announced that Fujitsu will purchase 80% of mainframe maker ICL, a subsidiary of STC PLC, for $1.27 billion. The deal is expected to be completed by Nov. 30.

Takuma Yamamota, chairman of Fujitsu, said the ICL name will be retained and Peter Bonfield will continue as ICL's chairman and managing director.

Fujitsu, a company with $17.8 billion in annual revenues, said the acquisition of the $4.7 billion company would make Fujitsu the second largest computer group in the world.

Completion of the sale is dependent on approval from the U.K. government.

Worth Noting

"Users with multiple voice processing applications should implement one and [then] the others after the first has been [perfected]. Don't try to do the whole thing at once. It's too complicated, and you can end up shooting yourself in the foot."

Anita Bounds
Director of worldwide telecommunications
American Express Co.
Phoenix

Carrier Watch

Bell Atlantic Corp. has formed a users group for the dozen corporations, universities and state agencies that subscribe to Integrated Services Digital Network Basic Rate Interface (BRI) service provided by its Bell operating companies.

The Bell Atlantic ISDN Users Group was created to provide ISDN users with a forum to discuss ISDN applications and experiences. Members include Johns Hopkins Health System, West Virginia University, Old Dominion University and the Commonwealth of Pennsylvania Department of Transportation.

The group, which held its first formal quarterly meeting at Johns Hopkins Health System in Baltimore on June 21, will convene at West Virginia University in Morgantown in September but has not yet selected a date.

Edward Thyberg, network systems manager at Johns Hopkins Health Systems, delivered a presentation at the first meeting on his organization's use of about 500 ISDN BRI lines supporting 650 users. "By meeting with other Bell Atlantic ISDN users to exchange experiences, we'll learn how to more efficiently use the service," he said.

Subscription service helps users study Tariff 12 deals

Provides analysis of rates, trends and features.

By Anita Taff
Washington Bureau Chief

NEW YORK — In an effort to help users negotiate custom telecommunications contracts, MBG Associates, Inc., a consultancy here, is developing a service that will enable customers to analyze existing AT&T Tariff 12 deals.

The subscription service, which is scheduled to be available in September, will provide users with an analysis of rates, trends and special features of AT&T Tariff 12 deals. It will initially be available in paper format and will later be offered on-line if demand warrants, according to Allen Shoemaker, MBG project manager.

Subscription costs for the service will be $1,000 for an initial set of network analyses, which covers all Tariff 12 deals filed to the date of subscription.

Quarterly updates, which describe new Tariff 12 deals and revisions to existing Tariff 12 networks, will be available for $500 per year.

A yardstick

Due to the sheer number of custom deals from AT&T, users are finding it increasingly difficult to sort out their options and get the best possible deal from AT&T, Shoemaker said. AT&T currently has filed 55 deals under Tariff 12.

The Tariff 12 analysis service will give users a baseline against which they can judge their own network needs, Shoemaker said.

"If you're a user with a certain level of traffic and a certain kind of [network] structure, you can look at [the different Tariff 12 deals] and get some kind of ballpark figure of what you can expect if you sign up for a Tariff 12," Shoemaker said. "At least it gives you a starting point."

Few users have the resources to study all the Tariff 12 deals side by side and do a thorough analysis, according to Shoemaker. It's important to see the deals all together in order to detect trends that could help users better position themselves in negotiations with carriers, he said.

"We do a comparison of the average cost per minute for different options, and there's not nearly as much variance as you would expect between different options based on size or other things," Shoemaker said.

"AT&T often makes you believe that you're special and because you're so special, it's going to give you a special deal for this option," Shoemaker said. "[But] when you really look at the numbers empirically and compare them, it's really not as special as you would think. The way they lead you on sometimes, it's hard to understand that."

WASHINGTON UPDATE

BY ANITA TAFF

RBHCs allowed to carry New Zealand traffic. The Department of Justice last week gave Bell Atlantic Corp. and Ameritech approval to carry traffic between the U.S. and the companies' newly acquired telephone company in New Zealand, the Telecom Corp. of New Zealand, Ltd.

Final approval, however, is still required from U.S. District Court Judge Harold Greene.

Regional Bell holding companies are currently prohibited from providing long-distance service by the Modified Final Judgment.

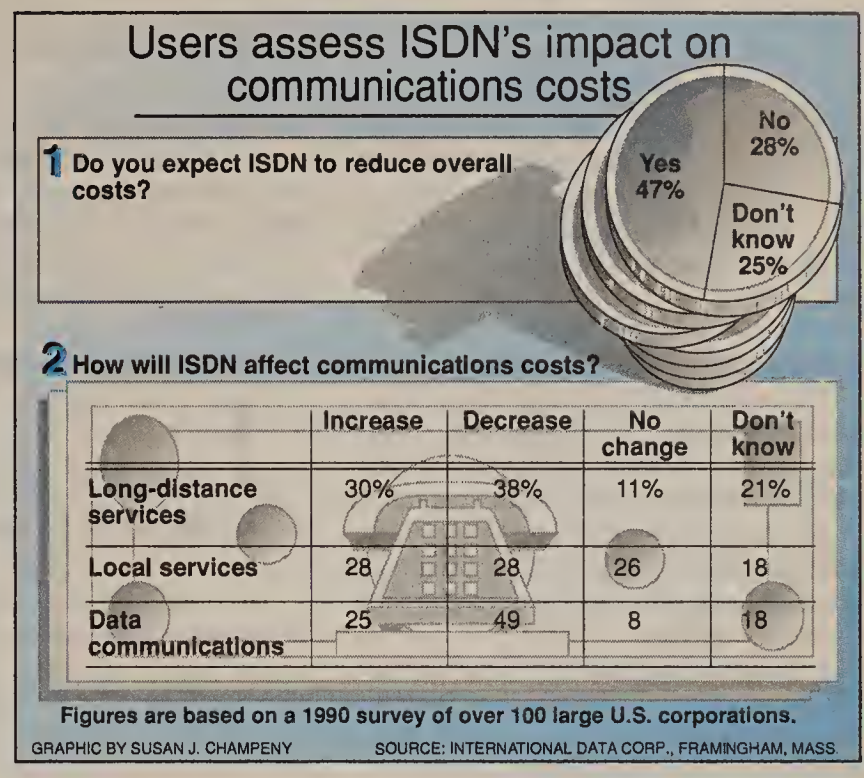
In issuing the ruling, the Justice Department said there is no substantial possibility that the two RBHCs could impede competition in the U.S.

AT&T, US Sprint Communications Co. and MCI Communications Corp. filed objections to the deal, claiming the RBHCs might discriminate in providing local access to international carriers that terminate traffic with a New Zealand Telecom rival.

The Department of Justice said this deal is similar to a deal in which Pacific Telesis Group was allowed to purchase a small percentage of an undersea cable between Japan and the U.S.

Bell Atlantic and Ameritech, like Pacific Telesis, intend to

(continued on page 12)



Objective of ISDN eludes net managers

IDC study finds carriers have failed to inform users about technology, applications and pricing.

By Bob Wallace
Senior Editor

FRAMINGHAM, Mass. — Users don't have a clear understanding of Integrated Services Digital Network technology, applications and pricing, according to a recent report by International Data Corp. (IDC), a research firm based here.

Part of the blame for the slow acceptance of ISDN, according to the report titled "ISDN User Spending," rests with those who are trying — and failing — in their efforts to sell ISDN as a key technology instead of a new network service. The report is based on a survey of net managers at more than 100 U.S. corporations spanning five vertical industries.

The respondents manage networks for firms with an average of 446 employees, as many as 3,500 workers and average networking staffs of 16. The lion's share of the users have T-1 or leased-line nets.

Before users can buy ISDN, they have to understand the technology. Respondents, however, had trouble defining the ISDN Basic Rate Interface (BRI) and the Primary Rate Interface (PRI). "Fifty-one percent don't know whether PRI or BRI is closer to Centrex, while 17% believe PRI is the ISDN version of a switched local access exchange service," the report stated.

IDC estimates that BRI is available to 8% of all users across the country. But in the survey, 35% of the respondents said they believed the 2B+D service is available now, 13% said it isn't, and 52% said they didn't know if it is available.

Similarly, IDC estimates that PRIs are available for roughly 60% of the installed PBX base. Yet 40% of survey respondents didn't know if PRIs were available for their private branch exchanges, 31% thought PRI was available for their switches, and 29% said PRI was not available for their switches.

"This data reveals that ISDN has not moved beyond the lab and manufacturing plant," IDC concluded. "Combined with user awareness results, it is apparent that early sales efforts must focus on education, not a hard sell."

"This data reveals that ISDN has not moved beyond the manufacturing plant."

▲▲▲

Part of the problem, according to the report, is that vendors are not educating users about ISDN. More than 80% of users surveyed have not been approached to buy ISDN products and services.

The report said the number of users that view ISDN as a new telecommunications service outnumber those who view the technology as the solution to business problems by a 2-to-1 ratio.

Just under half (47%) of the users surveyed view ISDN as a means of decreasing communications costs, while 28% do not,

(continued on page 12)

No summer lull for advances in call aggregation, fax nets and ANI

By Daniel Briere
Contributing Editor

Although the summer is typically a slow time for the telecommunications industry, there have been noteworthy developments concerning call aggregation, facsimile networks and automatic number identification (ANI).

Call aggregation

Aggregators may soon find themselves on the endangered species list. Tariff changes have forced many to sell their client base to more established aggregators.

At a recent conference on call aggregation sponsored by United Telecommunications, Inc., aggregators were sharing their strategies on how to survive. A primary tack involved finding ways to put off having to deal with AT&T's Channel Distribution Ordering Center, which AT&T hopes will help it control aggregators better.

Aggregators made the ordering center sound like telecommunications hell, where untrained and unmotivated AT&T support representatives delay and ruin many existing aggregator operations.

One of the most interesting survival strategies involved an aggregator who said privately that he maintains multiple Software-Defined Networks (SDN), the primary service used for aggregation.

He claimed to have direct control over six SDNs that are set up in different ways so as to buffer his clients against future policy changes from AT&T. One has its own third-party billing; another has AT&T billing. Two are under the names of other companies, and two are in reserve. Indeed, the emphasis for aggregators today is how to avoid AT&T notice. Several aggregators spent most of their time at the conference talking with SDN owners to see if they could "hide" customers under their SDNs.

Certainly, the jury is still out on the whole aggregation issue. AT&T is rapidly trimming its sales force though and can effectively use aggregation to reach the low and mid-range end of the marketplace.

While AT&T is obligated to make its tariffed services generally available to the public, the untariffed items such as billing and support services are being constrained severely so that only selective SDN aggregators will be left. In this manner, AT&T can use aggregation to its advantage but not let it get out of hand.

Fax networks

Fax usage is soaring. What's more, use of the broadcast feature of fax machines is increasing to the point where many machines are often busy all day sending outbound faxes.

Fax network services can help solve that problem. While fax nets are by no means perfect — they are unjustifiably expensive, at around 60 cents per minute, and have their limitations with data entry and list support — the bottom line is they can make your entire operation more efficient.

First, with one transmission to a fax net, your message is on its way. In the past, personnel had to monitor transmissions to make sure they were proceeding as required — even with the broadcast mode.

Second, use of fax services frees your machine for inbound messages.

Third, you can send longer messages. Some machines are capable of only 10 pages of storage, but fax networks offer nearly unlimited document storage.

Finally, you can include your own fax number for transmission so you can get a review copy of what you sent. A feature is in development that allows users to approve a transmission before broadcasting.

ANI uncovers the truth

Finally, for all the anti-ANI-ers in the world, comes a great application of ANI that is saving the world from corruption.

USA Today regularly performs call-in surveys concerning various topics using its 900 numbers. Recently, the paper did such a survey of its readership about Donald Trump. Callers were asked to agree with one of two statements: "Donald Trump symbolizes what makes the U.S. a great country," or "Donald Trump symbolizes the things that are wrong with this country."

The final tally showed an amazing 81% of the readership in favor of the first statement, that Donald Trump represents the best of the U.S. As part of its 900 service, *USA Today* received a listing of the calling numbers collected via ANI at the time of the calls.

Upon an analysis of the numbers, *USA Today* concluded that 72% of the favorable calls came from a company owned by Trump supporter Carl Lidner Jr. Some people will do anything the boss wants.

Finally, for all the anti-ANI-ers in the world, comes a great application of ANI that is saving the world from corruption.

▲▲▲

Objective of ISDN eludes net managers

continued from page 11

and 25% said they did not know if the technology would help them reduce costs (see graphic, page 11).

Customers' perception of ISDN pricing is not in line with actual prices, according to the report. Some Bell operating companies charge about $20 a month per BRI line, but only 12½% of survey respondents said they believe BRI costs less than $21. Thirty-seven percent said they believe BRI prices are double what they actually are, and 16% said think they are three times higher, the report said.

"These findings indicate a significant opportunity for local exchange carriers to attract customers with advertising that recalibrates user price perceptions," IDC concluded. AT&T may want to consider the same strategy, the report said. Although AT&T cut the cost per call for automatic number identification from 3 cents to 2 cents last fall, the majority (75%) of the survey respondents didn't know what AT&T charges for the ISDN PRI feature.

Mary Donovan-Thomas, a research analyst with IDC, said users have to shoulder some of the blame. She said she recommends they keep better track of carriers' ISDN filings and periodically review pricing for ISDN hardware and software. "Users need to keep better tabs on the ISDN market," she said.

Washington Update

continued from page 11

market services only on the foreign end of the international links.

Therefore, the Justice Department concluded, it would be complicated to set up a system to discriminate against certain U.S. carriers.

Bell Atlantic and Ameritech announced the purchase of New Zealand Telecom on June 14 in order to provide service within New Zealand and international traffic originating from that country.

On June 20, the carriers asked the Justice Department and Greene for a waiver to provide international service.

The New Zealand government requires that the transaction be finalized before Sept. 12, the companies said.

If they don't get the waiver in time, the RBHCs will have to put the international operations into a separate unit pending Greene's decision.

Such a move, according to the RBHCs, will create substantial costs and, therefore, raise rates to customers.

MCI merger OK'd. The Common Carrier Bureau of the Federal Communications Commission last week gave MCI Communications Corp. final approval for its acquisition of Telecom*USA, Inc., the nation's fourth-largest long-distance carrier.

The bureau had examined the deal to ensure that it would not damage industry competition.

After studying the merger, the Common Carrier Bureau concluded that the combined companies will still be subject to vigorous competition from AT&T and US Sprint, the nation's largest and third-largest carriers. The merger will serve the public interest, the bureau concluded.

MCI is now authorized to take control of the five companies comprising Telecom*USA: SouthernNet Systems, Inc., SouthernNet of South Carolina, Inc, Teleconnect Co., Teleconnect Long Distance Services & Systems Co. and TS Communications, Inc.

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

"In the past, networks have been useful and necessary but [users'] minute-to-minute operations haven't depended on them so much. But it's been evolving dramatically toward that."

Charles Murphy
Senior technical staff member
IBM
Research Triangle Park, N.C.

Data Packets

Universal Data Systems, Inc. (UDS) last week introduced its first radio frequency modem, which enables users to broadcast asynchronous and synchronous data at 9.6K bit/sec from devices such as hand-held data entry terminals. The DR 96 modem operates in half-duplex mode and includes a DB-9 interface, which is a nine-pin connector that supports attachment of data terminal equipment.

The unit broadcasts data in the 470-MHz bandwidth. Under optimum atmospheric conditions, the DR 96 can broadcast data over a range of 100 miles. The unit comes with a rechargeable battery that supplies power for up to 10 hours.

The DR 96 is expected to be available in October for $1,295.

US Sprint Communications Co. last week filed with the General Services Administration for price cuts on the 56K bit/sec data services it will provide under its portion of the Federal Telecommunications System 2000 contract. The cuts will apply only to dedicated transmission services and not to switched 56K bit/sec data services.

US Sprint said the amount of the price cut would vary widely from one government agency to another, depending on volume, but that all cuts would be at least 10%.

Exceeding DECnet Phase IV address limits

Users can build DECnet Phase IV networks that exceed the maximum of 63 areas by using the following techniques to "hide" areas. Nodes in hidden areas may not be able to communicate with all other nodes.

- **Set packet filter parameters to prohibit routing of traffic between certain DECnet areas, enabling DECnet areas to be reused.**
- **Set circuit cost parameters to limit the number of remote sites that packets will be routed between to ensure that DECnet nodes with the same address do not receive unintended packets.**
- **Build an area partition that enables nodes in a common area to communicate so that other areas can be reused.**

SOURCES: FERMI NATIONAL ACCELERATOR LABORATORY, BATAVIA, ILL., AND DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Users tweak DECnet to expand addresses

DEC and research group hide DECnet areas to break limits of Phase IV addressing scheme.

By Jim Brown
Senior Editor

Users nudging up against DECnet Phase IV's addressing limitations can exploit the same DECnet features used by Digital Equipment Corp. and a national research collaborative to extend the addressing capabilities of their networks.

Both DEC and Fermi National Accelerator Laboratory took advantage of existing DECnet features to go beyond the limits of DECnet Phase IV's address scheme, which splits a single DECnet into 63 areas, each supporting 1,023 node addresses. This enables DEC and Fermi to reuse DECnet area numbers by hiding areas from one another.

Areas are hidden by using DECnet parameters to limit the flow of traffic between DECnet Level 2 routers, which pass traffic between DECnet areas.

That enables DECnet users to have two areas with the same number because it prevents the flow of traffic from nodes in one of the areas to nodes in the other.

But hiding DECnet areas has a major drawback. Nodes with addresses in hidden areas cannot communicate with all other nodes on the same DECnet. But even that problem can be overcome through a few somewhat complex techniques.

For instance, DEC simply tells workstation users in a hidden area to log onto a VAX outside their area that is able to communicate with all other devices.

Fermi uses a technique called poor man's routing, in which the address of a node in a hidden area is converted to the address of a Level 2 router that can access nodes outside a hidden area. This tricks other Level 2 routers into thinking the traffic was generated by a node outside a hidden area.

"Unfortunately, we have to do a lot of this stuff," said Phil Demar, network analyst with Fermi, which operates the nationwide High Energy Physics network (HEPnet), a DECnet-based network interconnecting DEC VAXes at various universities. The problem is that universities have some systems on local DECnets that need access to HEPnet, while others do not.

So, Demar said, Fermi instructs universities to place nodes that do not need HEPnet access in hidden areas. This enables each university to build internal DECnets without having to worry about how their addressing affects other universities.

DEC simply ran out of areas as its internal Easynet network expanded worldwide. "We allocated all the areas," said Steve Kelly, DECnet Open Systems Interconnection marketing manager and former Easynet manager.

Both DEC and Fermi found that the easiest way to hide areas is to use DECnet's maximum area parameter, which instructs Level 2 routers to ignore traffic coming from or going to nodes in hidden areas.

For instance, setting the maximum area parameter at 50 instructs Level 2 routers to route traffic only between Areas 1 through 50 and to ignore traffic in Areas 51 through 63. That prohibits nodes in Areas 51 through 63 from communicating with one another, but nodes in the same hidden area can communicate

(continued on page 14)

Net services company's RFP calls for TDMs, packet gear

ARINC's net is intended to last 10 years.

By Paul Desmond
Senior Editor

ANNAPOLIS, Md. — Aeronautical Radio, Inc. (ARINC), a nonprofit company that provides network services for the air travel industry, has embarked on a project aimed at increasing the capacity of its net to meet growing demand and support new services.

ARINC has issued a request for proposal for a new backbone network, based on time-division multiplexers (TDM) and packet switches, that is intended to give the company the capacity it needs to support bandwidth demands that are expected to triple in 10 years.

In addition, the new net will support links to a myriad of airline computer reservation, credit card authorization and other networks by using industry standards including X.25 and the Open Systems Interconnection X.400 electronic mail protocol.

ARINC, owned by a group of major airlines, runs the ARINC Data Network Service (ADNS) network. According to Daniel Sassi, vice-president of administration for the company, ADNS handles more than six million messages per day and is one of the world's largest private packet-switched networks.

ADNS provides data links between airline computer reservation systems and also supports airline operation applications, such as flight conditions, plane locations and flight plans, for some airlines. Through ADNS, airlines and travel agents can also access credit card or check authorization data bases, Sassi said.

Demands for all of those services are growing as airline traffic grows, said Jim Sellman, ARINC's manager for systems planning.

To support the added traffic and planned services, ARINC issued an RFP for a network, dubbed ADNS II, that will at first supplement and eventually replace ADNS.

The new net will consist of at least 16 nodes comprising both T-1 TDMs and packet switches, giving ADNS II the ability to sup-

(continued on page 14)

GDC christens new tech support center, services

By Paul Desmond
Senior Editor

MIDDLEBURY, Conn. — DataComm Service Corp. (DSC), the service subsidiary of General DataComm Industries, Inc., last week announced the opening of an operations center along with new customer service offerings.

DSC's Technical Operations and Assistance Center (TOAC), unveiled here Friday, will help DSC engineers isolate faults in users' equipment without having to send field engineers to customer sites. It will also house a new 24-hour network monitoring service dubbed First Response.

General DataComm sells networking equipment ranging from modems to a family of T-1 multiplexers. DSC provides the Meganet family of services.

At the new TOAC, DSC technical support and application engineers use General DataComm net management systems loaded with data that duplicates customer network configurations. That data, which is either stored at the TOAC or downline-loaded when a problem occurs, helps engineers determine whether the glitch is a software bug, hardware fault or configuration problem.

Once identified, problems can either be remedied by personnel at the user site or remotely from the TOAC. For more complicated problems, users can transmit more detailed data or send a disk containing data to the TOAC.

The company claims that many network restorals will take less than 15 minutes with the new service.

The TOAC will also be used to support First Response, under which DSC personnel will oversee day-to-day network activity of customer equipment and watch for potential faults. First Response is intended to enable the company to resolve network faults from the TOAC.

"A lot of companies today don't have the expertise required to do their own network management," said Nathan Muller, GDC's manager of consultant relations. "We can do it for them and relieve our customers of a lot of that staffing load and associated costs."

Both new services are offered under Meganet contracts. Prices vary depending on network configuration.

Users tweak DECnet

continued from page 13

through Level 1 routers, which only route traffic between nodes in a single area.

Demar said Fermi allows nodes in different hidden areas to communicate by cascading Level 2 routers together. He said each campus has a Level 2 router with its maximum area parameter set at 63. That router is attached to the same Ethernet as nodes in a hidden area, and it is also linked to a dedicated Level 2 router, which provides access to HEPnet.

This configuration enables the on-campus router to pass traffic to nodes in all other areas on the same campus. When the on-campus router cannot locate an address in its routing tables, it passes the traffic to the router providing access to HEPnet, which ignores traffic from nodes in hidden areas.

While the maximum area parameter enables users to hide a few DECnet areas, there are others that hide many more.

DECnet's maximum cost parameter limits the number of Level 2 routers through which traffic can be passed. This parameter works with DECnet's circuit cost parameter, which enables users to assign a cost value to each circuit in the network in order to set up least-cost paths between locations.

By setting the maximum cost at 25, traffic can only flow across a circuit path with a total cost of 25 or less. This ensures that traffic destined for a DECnet node in a hidden area on one network is not received by the node with the same address on another.

Demar said Fermi has even used an obscure method to let two nodes on two different DECnets communicate. With this method, users must configure a point-to-point circuit between the nodes using DECnet's transport-type nonrouting IV feature, which allows the systems to communicate but hides the rest of the nodes on either network from each other.

Demar said Fermi stopped using this feature in favor of a technique called area partitioning, which enables all nodes with addresses in the same area on two different DECnets to communicate. Nodes in all other areas remain hidden from one another.

Area partitioning requires Level 2 routers on both networks to pass traffic through a Level 1 router. Because Level 1 routers only pass traffic between nodes in one area, traffic from nodes in hidden areas on one network is not passed to the other net.

Company's RFP calls for TDMs

continued from page 13

port both voice and data, Sellman said. The current net is a data-only facility based on seven packet-switching nodes from Concurrent Computer Corp.

The RFP also states that the multiplexers must have bandwidth management capabilities that will let ARINC clients reserve bandwidth on an as-needed basis for functions such as nightly file transfers, Sellman said. Additionally, the TDMs will support applications such as image and facsimile that are more suited to circuit switching than packet switching.

Trunk speeds will be increased from today's maximum of 19.2K bit/sec to T-1 and fractional T-1 speeds, he said.

The combination of more bandwidth and more network access points is expected to improve network transit time from an average of 550 to 600 msec today to somewhere in the low 200 msec area, Sellman said.

Also required in ARINC's RFP is support for X.25 and IBM's Synchronous Data Link Control (SDLC) protocol. SDLC will support links to the IBM mainframes used by many airlines, he said.

Likewise, there is a growing trend among airlines to standardize on X.25 and move away from the myriad of proprietary protocols traditionally used in the industry, he said. Messages sent to ADNS II via X.25 or SDLC will not need to be routed through a protocol converter. ARINC has also specified support for the OSI X.400 E-mail protocol in its RFP, Sellman said.

Responses to the ARINC RFP are due Sept. 20. The company's objective is to select a vendor by year end and complete the project by the end of 1993.

See the Action Center for networking products & services!

Use the Action Center Reader Service Card
and get free information
on networking products & services.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

A recent survey by Computer Intelligence of La Jolla, Calif., revealed that of 9,100 DEC VAX users, only 5% have token-ring local-area networks installed at their businesses, while 83% have Ethernet LANs.

Netnotes

Tiara Computer Systems, Inc. recently announced the LanCard/E 2000, a 16-bit Ethernet adapter that has been certified by Novell, Inc. as compatible with NetWare 386 3.1. The board will automatically configure itself for 16- or 8-bit mode.

Other features include 16K bytes of buffer memory, jumper-selectable interrupts, connections for both thick and thin Ethernet cable, and sockets for remote-boot programmable read-only memory chips. The LanCard/E 2000 is priced at $350.

Tiara can be reached at 1091 Shoreline Blvd., Mountain View, Calif. 94043; (415) 965-1700.

Compex, Inc. in Anaheim, Calif., one of the largest OEM suppliers of Novell, Inc.'s NetWare, said last week it will bundle two Ethernet adapters free of charge with each purchase of the company's Advanced NetWare 286 Version 2.15.

As part of a three-month promotion that began July 30 and will run through Oct. 31, Compex said it will bundle two 8-bit Ethernet boards with a retail value of $295 each, as well as Novell software drivers, with every copy of Advanced NetWare Version 2.15 sold to distributors and value-added resellers. This deal will be passed on to end users, according to a Compex spokeswoman. The Compex Ethernet adapters support IBM Personal Computer ATs and XTs.

For more information, contact Compex at 4055 E. La Palma, Unit C, Anaheim, Calif. 92807; (714) 630-7302.

Ethernet adapter makers embroiled in price battle

Vendors cut prices, offer warranties to get sales.

By Laura DiDio
Senior Editor

The Ethernet wars have begun raging anew in recent weeks with several vendors of network interfaces slashing prices and offering lifetime warranties and value-added enhancements.

Western Digital Corp. in Irvine, Calif., sparked the latest round of reductions eight weeks ago when it slashed the price of its 8-bit EtherCard Plus from $349 to $249 and lowered the price on its 16-bit EtherCard Plus from $399 to $349.

The firm, which owns nearly a third of the Ethernet interface market, also extended the warranty on all its local-area network adapters from one to five years.

IMC Networks Corp. in Tustin, Calif., fired a return volley 10 days ago when it began shipping its new 8-bit EtherNic for $199, which is the lowest list price in the industry, according to IMC President Jerry Roby.

Roby promised that IMC will also be a price leader when it begins shipping 16-bit and Micro Channel Architecture bus-based adapters within the next few months.

Racal InterLan in Boxborough, Mass., also leapt into the fray last week, slashing tags by as much as 25% on its Ethernet adapter line.

Racal InterLan's NI5210, 8-bit, thick- and thin-wire Ethernet adapter now costs $295, down from $395; the NI5210 8-bit 10BaseT card now sells for $350, down from $450; the similar 8-bit LattisNet unshielded twisted-pair card has been cut from $450 to $395.

Additionally, Racal InterLan

(continued on page 17)

IMC began shipping its new 8-bit EtherNic for $199, the lowest list price in the industry.

▲▲▲

Novell's new net analyzer designed for the nonexpert

By Susan Breidenbach
West Coast Bureau Chief

SAN JOSE, Calif. — Novell, Inc. is putting the finishing touches on a new version of its LANalyzer network analyzer that is supposed to enable network administrators to diagnose and resolve network problems without the help of a protocol expert.

The ease-of-use improvements are provided by three new features: a library of predefined testing routines, an on-line troubleshooting guide and a multiple-channel monitoring capability. This is in contrast to competing products and the original LANalyzer, which simply snoop on the network, capturing packets and decoding protocols.

The most important feature is an Application Test Suite that contains more than 40 predefined testing routines. Users input the requested criteria and the test is automatically performed.

The new menu-driven troubleshooting guide takes nonexperts through the testing process step-by-step, suggesting probable causes for network disruptions and recommending additional testing procedures to confirm the diagnosis.

The multiple-channel monitoring feature lets users gather data on nine channels and graphically display it in real time.

The LANalyzer comes with some predefined channels and as many as eight of the nine simultaneously displayed channels can be user-defined. Each channel can filter up to 16 distinct criteria, thus separating the often small amounts of pertinent data from the huge total volume of network traffic.

The LANalyzer consists of software for IBM Personal Computer ATs and a specialized add-on board. "Other network analyzers use off-the-shelf boards that are designed to reject junk on the network," said Kevin White, vice-president of development for the LANalyzer division. "But you need the junk for analysis purposes, so we designed some specialized hardware."

The new LANalyzer kit costs $9,980 and will be available Aug. 27. It will support any combination of Ethernet, token-ring or Arcnet local-area networks.

Network technicians from Corporate Computer, Inc. built a 120-node LAN to support the Goodwill Games that is based on, among other things:

- The new 3.1 release of Novell, Inc.'s NetWare 386
- Mirrored servers
- Four SynOptics, Inc. LattisNet concentrators
- A hub-to-hub fiber-optic backbone

Goodwill Games net a multivendor marvel

LAN used by broadcaster to link 50 trailers was built with a mix of available and custom products.

By Susan Breidenbach
West Coast Bureau Chief

SEATTLE — A teleprompter is not something that typically comes to mind when one thinks of a local-area network node, but the device feeding lines to the sports anchors at the recent Goodwill Games here was just that.

The teleprompter was part of a collection of off-the-shelf, custom-designed hardware and software used to build a LAN connecting 50 trailers that house Turner Broadcasting System, Inc. (TBS) temporary broadcasting facilities.

The glue holding it all together included Novell, Inc.'s new NetWare 386 Version 3.1, four SynOptics Communications, Inc. LattisNet concentrators and a hub-to-hub fiber-optic backbone.

"It was supposed to be a very small network, mostly for word processing, and it quickly got out of hand," said Walter Taucher, a network specialist at Corporate Computer, Inc., the consultancy here that designed, installed and managed the TBS LAN.

What was originally budgeted at $20,000 turned into an assemblage of hardware and software valued at about $150,000. Besides providing basic word processing and electronic mail functions, the LAN supported custom applications that handled event management and the TBS videotape library.

The entire 120-node network was a single LAN connected to one main NetWare file server, a 33-MHz Intel Corp. 80386-based Arche Technologies, Inc. Arche Legacy 386-33. To provide fault tolerance, the Legacy 386-33 was mirrored by a 25-MHz Arche Rival 386-25 via Network Management, Inc.'s LAN Shadow product. Additional insurance came from a bank of three 600-watt uninterruptible power supplies.

The same Legacy/Rival pairing was used to turn two more machines into a fault-tolerant foundation for an application server dedicated to a Btrieve application that handled the videotape library files. The application, written for the 1988 Olympics by Nesbitt Systems, Inc., kept track of both video and textual information available to members of the media.

All of the TBS coverage of the Goodwill Games was captured on videotapes that were bar-coded and registered in a tape library by scanning the code. That code, in turn, was used to track tapes that journalists checked out. The server handling the tape library included more than 50M bytes of data before the end of the first week and was growing at the rate of 10M bytes a day.

A pair of 80386-based Toshiba Corp. 5200 laptop computers with 4M bytes of random-access memory was used to provide a fault-tolerant DOS-based data base server that ran TBS' event management system. Developed with the help of Wayne Ratliffe, author of dBase II, the custom-designed software was used to coordinate such activities as athletic events, housing, press accreditation and travel.

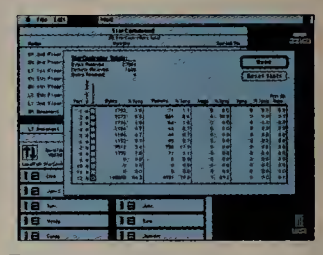
The application, based on Ratliffe Software Production, Inc.'s Emerald Bay data base management system, was written in the product's associated Vulcan application development language.

The various departments worked against the same data base, and Corporate Computer worked with the developers to come up with a security system that would give each department access only to the portions of the

(continued on page 17)

Our new StarController has reliability written all over it.

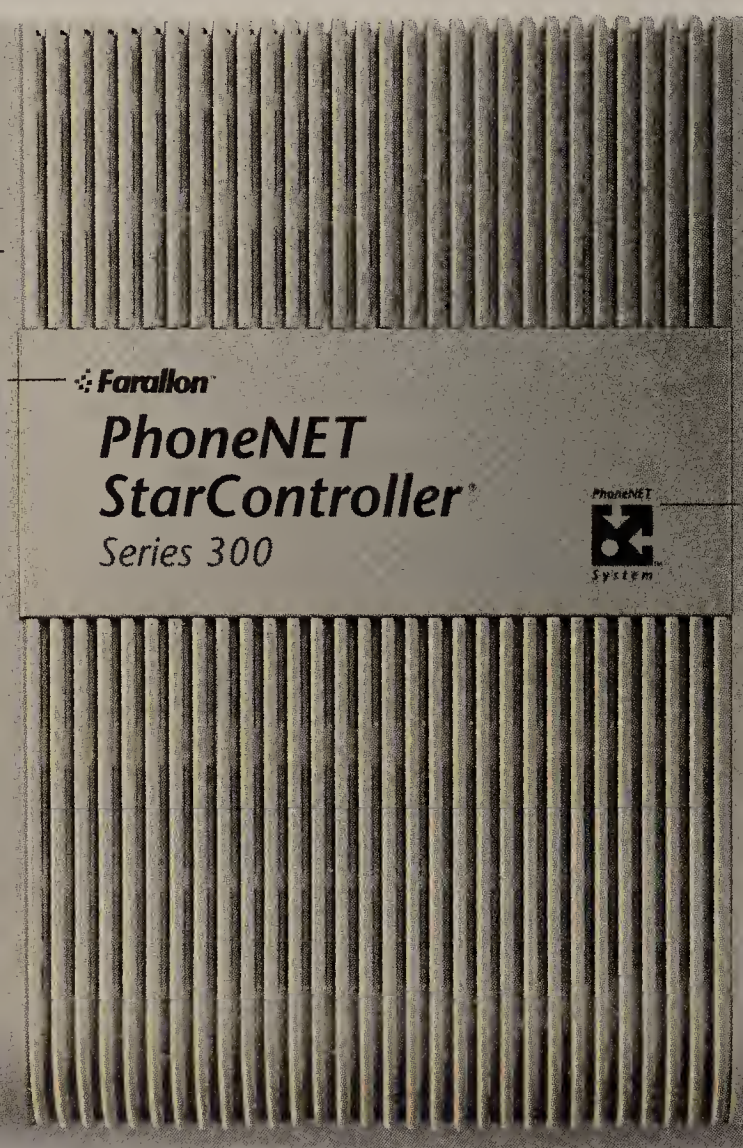
Reliability starts here. The new PhoneNET StarController® Series 300 has just the right amount of output voltage: +/– 3.5V, the same as a Macintosh. Any more and you get noise, electrical reflections, and "crosstalk"—electrical phenomena that can make a network unreliable.



Even when everything else is down, you're up. The Series 300 external Management Bus operates outside of the rest of the network, giving your Macintosh data about the network even when a network is down. StarCommand™ software monitors port status automatically, and notifies the manager about problems for both LocalTalk and Ethernet networks. Plus, you get network diagnostics and traffic analysis.

LEDs provide a reliable way to shed light on port status and signal quality. The Series 300 detects jamming, automatically removes malfunctioning nodes from the network, and puts them back when the problem is cleared. It's the only hub that reports noise problems. The Series 300 delivers lots of data about each port, and even maintains port status during power failures.

When you're down to the wire, the Series 300 works reliably with twisted pair, quad cable or 25-pair cable. Which means you can build a reliable network in any building anywhere. The Series 300 amplifies and repeats LocalTalk signals over 12 ports, up to 48 offices. Each port will support 3,000 feet of cable to Apple computers and peripherals, and other LocalTalk-compatible devices.



A name you can rely on for reliable networks. Farallon invented networks over telephone wire. Easy installation, economy and reliability have made the PhoneNET System the standard for AppleTalk networks. And our technical support is widely recognized as the best in the business. No wonder there are more than a million PhoneNET nodes installed.

Reliability has its mark. Our first generation of StarController hubs is still performing reliably for over 400,000 users —with less than 1% failure in three years. The PhoneNET® System logo is your assurance that the Series 300 will perform to specifications. It guarantees that the Series 300 is compatible with the entire PhoneNET System family of network products, including the StarController™ EN for use on Ethernet networks. And it assures you of extensive, high-quality documentation on network design, technical specs, and management and troubleshooting help.

For the name of the Farallon dealer nearest you, call Customer Service at (415) 596-9000. Dealers call our Reseller Hotline 1 (800) 344-7489.

Farallon™

The Personal Communications Company™

2000 Powell St., Suite 600, Emeryville, CA 94608 Fax (415) 596-9020.

See The FAXNeT Form on Page #17

Goodwill net a multivendor marvel

continued from page 15

records that were relevant to its activities.

"We needed a data base that within a given record would let accounting see this but not that and housing see that but not this," said Corporate Computer's Taucher. "There was no data base available that could do that, so we had to commission a custom job."

The use of fiber-optic cable as a backbone linking the four LattisNet concentrators was dictated in part by the harsh environment and by the heavy network traffic going between the hubs. Much of the cable was outside running across blacktop between trailers.

The blacktop turned into a "giant solar cell" during the day, causing copper wire to slow down significantly in certain weather conditions, Taucher said. This problem was identified early in the network installation process with the help of SynOptics' LattisNet Network Management software, which provides real-time monitoring of the net's physical layer.

Seventy of the LAN's nodes were Arche Triumph 286 Plus systems, with most of the balance being Toshiba laptops. Four Toshiba 3200s were used as in-studio workstations that writers used to create the copy to be displayed on a teleprompter for TBS announcers.

The teleprompter was based on an Epson Corp. Equity computer and connected to the LAN with a 3Com Corp. adapter.

Forty Toshiba 1200XE laptops were installed at the 15 sports venues, the accreditation center and the main press center. Equipped with 2,400-baud modems, they could be used by reporters to call into a NetWare Access Server attached to the LAN. This server contained listings of athletes and their biographies.

A cluster controller at the TBS site was connected to a remote IBM mainframe running Boeing Computer Services, Inc.'s sports results system. Acting as a gateway between the results system and the net was a workstation on the LAN that was connected to the cluster controller via coaxial cable. The gateway workstation ran Wall Data, Inc.'s 3270 emulation software and dumped results into a Microsoft Corp. Excel spreadsheet for analysis and display.

Other applications on the network included Microsoft's Word for Windows in French, German, Russian and Spanish to accommodate foreign journalists. There was also an Excel application running under Windows 3.0 that served as a time scheduler for broadcasting the games.

The initial messaging software was Lotus Development Corp.'s new Notes groupware product, but Corporate Computer quickly decided that package was overkill and switched to Consumers Software, Inc.'s Network Courier.

"Notes involved too much training and administration for a network that was only going to be operating for three weeks," Taucher said. By contrast, a new user could be brought up to speed on the Network Courier system in about 20 minutes.

Ethernet adapter makers in price battle

continued from page 15

reduced the cost of its 16-bit NI6510 AT/ISA Ethernet card from $395 to $375, while the NI6510 10BaseT version now costs $395, down from $450.

The company's MacConnect Ethernet NuBus NIA310 10BaseT board for Apple Computer, Inc. Macintosh microcomputers is now priced at $550, down from $625; the NuBus NIA310 thick- and thin-wire Ethernet adapter and the SE Bus NISE thick- and thin-wire card now cost $495 each, down from $549.

Effective July 30, Racal InterLan is also offering a lifetime warranty on all new Ethernet adapters and is bundling software drivers and proprietary diagnostic software tools with each Ethernet board at no additional cost.

Racal InterLan will, for example, bundle its EtherScope protocol analyzer software for AppleTalk protocols, Novell, Inc. NetWare Internetwork Packet Exchange (IPX) and Internetwork Protocol with its MacConnect products.

In addition, the company's LANTalk software, which is included with each personal computer Ethernet card, will now incorporate diagnostic software and drivers for NetWare Version 2.15 and NetWare 386 Version 3.1, Microsoft's LAN Manager Version 2.0, Banyan Systems, Inc. VINES Version 4.0 and Digital Equipment Corp. DECnet.

Not to be outdone, market leader 3Com Corp. enhanced its current three-year warranty for its line of EtherLink Ethernet adapters with a lifetime limited warranty.

Any defective adapter will be repaired or replaced, at 3Com's option, for as long as the board is in use in its original IBM Personal Computer AT, XT, Personal System/2 or Macintosh, or for three years from the date of purchase. The new lifetime warranty applies retroactively to all 3Com adapters sold since June 1, the company said.

Prices for 3Com's EtherLink series currently range from $295 for the 8-bit cards to $895 for high-end 32-bit interfaces. A company spokesman said 3Com has no plans at this time to lower board prices to match those of its competitors.

"It's a buyers' market," said Lee Doyle, manager of LAN research at International Data Corp. in Framingham, Mass. "Ethernet adapter prices are going down, down, down, and they won't bottom out until they hit $100 for an 8-bit card. The 16-bit cards, which are currently selling for about $250, will probably decline to about $170," Doyle said.

Who Can Give You A Complete Network Solution That Includes Fractional T-1 And ISDN?

A partial network solution is no solution at all.

And a network solution without FT-1 and ISDN leaves you unprepared for the 1990's.

Nor will you have the global digital connectivity which is critical to the future of your network.

That's why you need what only GDC can offer: a comprehensive network solution.

We give you access to all the elements you need to create a complete corporate network. From analog and digital data sets to powerful network optimization tools. Plus, we incorporate management and control capabilities into all of our networking products. This gives you complete control beyond the backbone, desktop-to-desktop.

What's more, a GDC network offers the flexibility to take full advantage of FT-1 and ISDN without sacrificing any of the benefits of private network control.

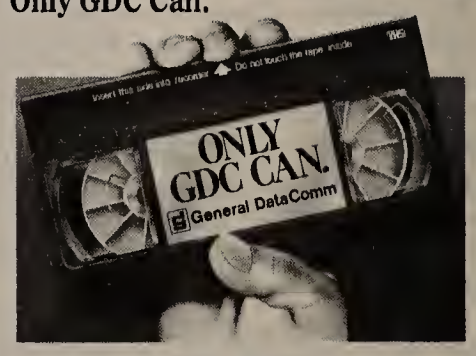
Our MEGAMUX® Transport Management System – the world's most advanced networking multiplexer – already has a proven ISDN Primary Rate Interface. And our FT-1 customers are already realizing major savings in line costs.

Further, MEGAMUX TMS offers Intelligent Automatic Rerouting to ensure maintenance of critical applications, and a unique adaptive downspeeding method where bandwidth is dynamically reassigned. This avoids denying service to users.

So consider the fact that only GDC can offer you this choice: you can start planning for the future of your network today, or you can pay the enormous price of trying to catch up later.

Remember, ours is the only total network solution. And it's backed by over twenty years of experience and worldwide service and support.

Find out more. Call or write for our free video. Because for a complete network solution with FT-1 and ISDN, **Only GDC Can.**



Call **1-800-777-4005,** General DataComm, Middlebury, CT 06762-1299. Tel: (203) 574-1118, Telex: 643357, Fax: (203) 758-8507.

See The FAXNeT Form on Page #17

General DataComm

Dialogue

Do you agree with the Federal Communications Commission's plan to loosen current regulatory constraints on AT&T?

"I have worked extensively with AT&T and am convinced they should be freed from regulation. Current regulations force AT&T to publicly reveal their plans and strategies, which gives their competitors an advantage.

"If there is a need for regulation, then AT&T's competitors should be required to go through the same process. In a country that prides itself on free enterprise, it seems inconsistent to single out any one company and hamper its ability to compete."

Wayne Robertson
Network administrator
Saint Agnes Medical Center
Fresno, Calif.

"In the short term, deregulation of AT&T could be a boon to users because it could bring lower prices and better service. But in the long run, AT&T could monopolize the market again. This would result in less competition and higher prices.

"AT&T still holds about 70% of the long-distance market. It has proven that it can make a good living even under existing regulations."

Coleman Burton
Director of telecommunications
University of Missouri
Columbia

"I agree with the FCC [plan] to loosen some of the regulatory contraints on AT&T. This would allow AT&T to offer much better services and lower prices. Further, AT&T could bundle products and services, which would be a big advantage for users. It's time to deregulate AT&T because the market is much more competitive than it used to be."

Walter Sing
Technology planner
First Boston Corp.
New York

"We simply need good services and low prices. Deregulation doesn't necessarily provide that. But anything that makes AT&T more flexible helps us to do our job because we depend on fast and efficient service."

Allen Wilmer
Manager of telecommunications development
Mastercard International, Inc.
St. Louis

Keeping morale high is a challenging job

Network managers offer advice on maintaining the productivity, enthusiasm of their staff members.

By Wayne Eckerson
Senior Writer

Along with the technical challenges of overseeing a corporate network, net managers agree that one of the most difficult and demanding aspects of their job is keeping staff members motivated and productive.

The key to maintaining positive morale in network departments is providing workers with jobs that are diverse and challenging, and offer opportunity for career advancement, according to managers interviewed by *Network World*.

Managers also have to make sure workers understand the importance of their job and how their efforts help the organization achieve its goals.

"Network professionals are talented people, and you can't let them get bored," said George Tabback, director of corporate information systems at Ingersoll-Rand Co. in Woodcliff, N.J. "You have to keep them busy, involved and challenged."

Tabback said he keeps staff morale high by rotating job assignments. Some days, staff members will work in operations, while other days, they will handle administrative duties.

When that fails, Tabback looks for other activities that will engage their interests. For example, he recently allowed a network operations manager, whose job had become fairly routine, to experiment with new uses for a personal computer.

The manager discovered a way to use the personal computer to send commands to a Timeplex, Inc. Link/1 T-1 multiplexer, automating the process of adding, subtracting and monitoring T-1 circuits, as well as aiding in the preparation of reports on circuit activity. Tabback said several hardware companies have expressed interest in the program

(continued on page 20)

GUIDELINES

BY ERIC SCHMALL

Managers should wield power of the press

Network managers can increase their visibility and effectiveness by harnessing the power of the written word.

By regularly submitting articles to the company's internal newsletter or newspaper, network managers can enlighten end users about new or underutilized network services and prepare them for major network projects that may affect them. These articles can also inform end users about ways they can use voice and data systems for strategic advantage.

For example, network managers could submit short articles that describe a variety of private branch exchange features that may be overlooked by most end users. Net managers could also submit an article prior to implementing a new voice mail system that describes what end users can expect from the upcoming changes. These articles might quote an executive commenting on the purpose of the new system, as well as end users from another company describing how a similar system has benefited their operation. In addition, these articles could explain in layman's terms how to use the new equipment.

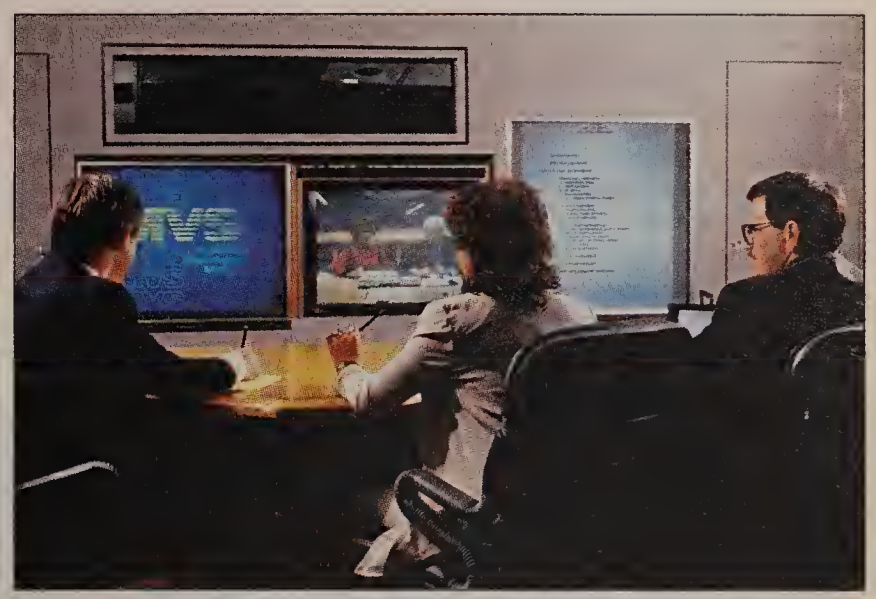
Articles such as these can give projects an official status that no memo issued by the network manager could ever match.

In some cases, net managers might be able to persuade the corporate communications group to write a feature-length story illustrating how communications has helped the company gain a competitive edge.

Using the power of the pen can help end users learn to view networking as a strategic asset, rather than a utility that's taken for granted.

Schmall is a network systems manager for an insurance holding company.

MANAGEMENT PROFILE



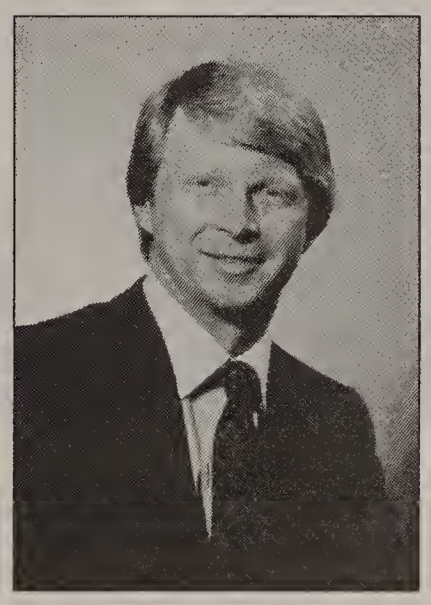
A videoconferencing room at Martin Marietta.

Videoconferencing aids Martin Marietta

By Ellen Messmer
Washington Correspondent

CHANTILLY, Va. — Videoconferencing is helping Martin Marietta Corp. improve internal communications and work more effectively with vendors and business partners.

For many employees of the aerospace company, videoconferencing has become a necessity, much like the telephone or the facsimile machine. In addition to supporting in-house communications, videoconferencing is used for negotiating with vendors. It



Richard Windrow

has also enabled Martin Marietta employees to work with personnel at other firms on joint business projects, cutting travel costs and increasing productivity.

The company conducts 15% of its videoconferencing outside the corporation.

Videoconferencing has even given Martin Marietta an edge in vying for government projects. The company has discussed its video capabilities in bids as evidence that it can work effectively with other business partners.

Martin Marietta has installed Compression Labs, Inc. Rembrandt coder/decoders at sites here, in Baltimore and Bethesda, Md., Deercreek and Viewpoint, Colo., New Orleans, Orlando, Fla., and Huntsville, Ala. Each site is also outfitted with a camera, an audio system, a high-resolution graphics scanner and large projection screen, as well as a laser printer for generating hard copies of graphics sent over the network.

Richard Windrow, Martin Marietta's videoconferencing project manager, said the company spent about $300,000 to outfit each of the videoconferencing rooms, with $275,000 of that sum going toward equipment and engineering. The firm reserves video transmission capacity at 768K bit/sec via US Sprint Communications Co.'s Meeting Channel.

Since 1987, use of the videoconferencing systems has grown from 60 hours to 180 hours per month. But costs per hour have actually dropped from $350 to $200 because of US Sprint's volume discounts.

Videoconferencing has proven to be a powerful tool for dealing with vendors, according to Alan Soucy, manager of Martin Marietta's Computing Standards unit, which uses videoconferencing to do business with about eight vendors, including Apple Computer, Inc. and Zenith Data Systems Corp. Soucy's group is responsible for evaluating microcomputer and local-area network technologies to develop a list of internal standards for Martin Marietta's volume purchases.

He said Martin Marietta wants

(continued on page 20)

Keeping morale high is a challenging job

continued from page 19

developed by the net operations manager.

While it's important to keep network jobs interesting and varied, morale can plummet if network professionals aren't given the opportunity to advance into more challenging positions, said Chuck Garrison, vice-president of telecommunications at the Chicago Board Options Exchange.

Garrison, whose department has been in a hiring freeze since the stock market crash of 1987, said he is willing to go to great lengths to ensure that his staffers can advance their careers. Garrison, who maintains close ties with several recruiters, often informs his workers about job opportunities at other companies.

For example, this spring, Garrison lost one of his best workers after he persuaded her to interview for an excellent position that opened up at another Chicago firm. While Garrison did not want to lose this worker, he knew it would be best for her and his department if she moved on.

As it turned out, the employee was offered the position and accepted it. This created an opening within the department that Garrison filled by assigning new, more challenging responsibilities to each of the remaining staffers and hiring an entry-level person to take up the slack.

"While this was tough to do, it allowed [the worker] to pursue her career without burning bridges behind her and kept morale from sinking in the rest of the department," Garrison said.

But advancement can be a double-edged sword. Managers can create morale problems by placing people in the wrong positions.

Some creative and talented technicians, who excel at designing and building networks, become bored and discontent if given the job of maintaining them, according to Patrick Springer, a consultant for Computer Task Group, a Needham, Mass.-based management consulting firm that specializes in communications.

"Managers shouldn't feel compelled to fill every opening with the most talented and skilled technicians available on the market," he said. "If they only want to fill an operations job, they should hire someone with an associate's degree, not a master's degree in electrical engineering."

Roy Carlson, vice-president of management services at Southern Pacific Transportation Co. in San Francisco, said morale can decline if members of a technical department feel they are not being compensated fairly. Many technical professionals get restless if they realize they are being paid less than technical workers in similar positions at other companies in the area, he said.

Carlson added that money isn't everything, however.

"If technical people sense that their work is not meeting some larger goal or helping to forward the objectives of the organization, then they may lose interest and stop being productive," he said.

According to Carlson, managers must clearly communicate company and departmental objectives to avoid morale problems.

Communications becomes especially important when a company is having financial difficulty or facing a merger, acquisition or some other unsettling event, according to Larry Acee, manager of communications and terminal support at New York Cash Exchange/Instabank in Buffalo, N.Y.

These situations create an air of uncertainty that can destroy motivation and prompt employees to look for more stable jobs elsewhere, Acee said. "It's important to dispel rumors and be as candid as possible with your staff," he said. "It's never an easy situation, but somehow you have to make them feel good about what they're contributing and keep them busy."

See The FAXNeT Form on Page #17

Videoconferencing aids Martin Marietta

continued from page 19

commitments on standards support and delivery from the highest level, and videoconferencing gives the company access to the senior executives of vendor companies who often are not available for in-person sales meetings. Soucy said that excuses from companies about the unavailability of top executives are useless with videoconferencing. "They can run, but they can't hide," he said.

Videoconferencing is also playing a role in Martin Marietta's joint efforts with other firms, including a venture with Texas Instruments, Inc. involving the development of hand-held missiles for the U.S. Army.

Videoconferencing allows engineers at the two companies to work hand in hand in the development effort, according to Steven Marcereau, vice-president for the AAWS-M, a joint venture of Texas Instruments and Martin Marietta that is managed out of Martin Marietta's Electronics & Missiles Systems group in Orlando. Videoconferencing enables designers at the two companies to jointly evaluate flight-test results and view videotapes of tests. In their bid for the project, the companies discussed how videoconferencing would help them work effectively together.

Martin Marietta also uses videoconferencing to work closely with Westinghouse Electronic Systems on a top security project. The videoconferencing transmissions are carried on a private satellite link and encrypted using special National Security Agency encryption devices. Videoconferencing is an alternative to flying 20 to 50 people per week between Martin Marietta and Westinghouse sites in Orlando and Baltimore.

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

U.S. residents make more calls per person than people anywhere else in the world, according to the Boston consultancy Economics and Technology, Inc., which estimates that the number of calls per person in the U.S. exceeds the average number made per person in Singapore by about 50%, and France, West Germany, Japan and the U.K. by nearly 300%.

World News

Bell Canada recently filed with the Canadian Radio-television and Telecommunications Commission to reduce long-distance rates for calls within that country and from Canada to the U.S.

On average, the proposal calls for 6% rate reductions in long-distance calls between Canada and the continental U.S.; rates would drop an average of 26% for calls to Alaska and 22% to Hawaii. Bell Canada also proposed a 19% cut in prices for 800 service between Canada and the U.S. Within Canada, long-haul rates should drop 15% on average.

If approved, the new rates will take effect on Dec. 1. The cuts would be the carrier's sixth rate reduction in less than four years.

AT&T last week opened the first Canadian node for its Global Messaging Services network. The node, which is in Ottawa, supports local access to AT&T Mail, electronic data interchange transport services and AT&T Enhanced FAX, a store-and-forward facsimile service.

The Canadian node is the third AT&T Global Messaging node outside of the U.S. Other foreign nodes are in London and Tokyo.

Report gives users insight into future of global nets

Says planning key to success of international nets.

By Walter Sweet
West Coast Correspondent

SHORT HILLS, N.J. — A major KPMG Peat Marwick study of more than 70 multinational companies underscores the importance of planning as users build or broaden global networks to support expanding international business efforts.

The $1.5 million "Global Networking Report" was sponsored by 24 companies, including AT&T, IBM, British Telecommunications PLC, Daimler-Benz AG, Electronic Data Systems Corp., Fujitsu America, Inc., Lloyds of London, Shell Oil Co. and Telecom Australia. The year-long study was completed late last month, and Peat Marwick is now reviewing it with these sponsors.

The report was designed to give users insights into the future of global networks, as well as strategies for successful implementation of international net facilities. It also explored the impact of global deregulation, saying that the loosening of regulatory restrictions in other nations will boost international network deployment and make global nets more powerful business tools for multinational companies.

The importance of planning

The survey showed that careful planning by information systems managers, senior executives and end users is the key to successful international network efforts.

"The best advice I can give is that you have to make sure network people and the user community are in sync early in the

(continued on page 22)

Users get key role in new mgmt. of France Telecom

By Barton Crockett
Senior Editor

PARIS — The French government last month adopted legislation that will give users a major role in steering France Telecom and make it easier for the carrier to deploy new services and facilities.

The legislation, which was signed by President Francois Mitterrand on July 2 and takes effect at the beginning of next year, removes budgetary and operational control of France Telecom from the French parliament and Ministry of Finance, and transfers it to a newly created board of directors and Office of the President. Users will be appointed to fill some of the 21 seats on the new management board.

According to government officials and users in the country, removing operational and management control of the carrier from parliament and the Ministry of Finance should give France Telecom greater freedom to invest in technologies and services that users need.

Parliamentary control makes it difficult for France Telecom to plan for new services, according to Jean-Francois Berry, director general of the Association Francaise des Utilisateurs du Telephone et des Telecommunications, a users group in Marnes-la-Coquette, France. This is because legislative deal-making can lead to sudden project cancellations or reductions in expenditures for political reasons.

Berry said that taking control of France Telecom away from a political body should improve management and enable the carrier to serve users better.

User-controlled carrier

Under the new structure, a board of directors comprising seven members of parliament, seven France Telecom employees and seven individuals chosen for their expertise in communications, will be picked by the government to head up carrier operations.

This group will choose the president of France Telecom and will have strategic, management and operational control of the carrier. This will enable the carrier to operate like a commercial organization in the mold of such French government-owned organizations as Renault Car Co., government officials said.

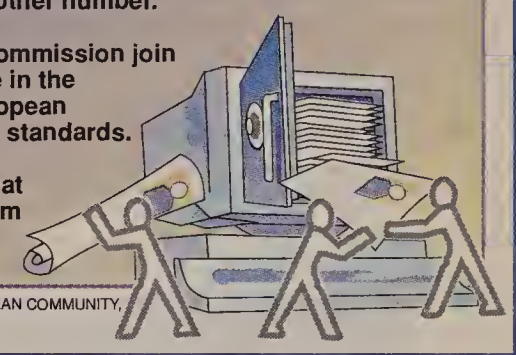
According to Berry, users are particularly excited about stipulations that members of major user organizations be represented on the carrier's board of directors.

"As far as we know, this is a first," Berry said. "We do not know of any other carrier that is led by users."

Protecting personal data

Primary elements of a European Commission proposal to safeguard the privacy of individuals

1. **Force companies to follow standard procedures designed to ensure that information about individuals is not improperly gathered or disclosed.**
2. **Give individuals the ability to suppress automatic number identification and require carriers to notify users when calls are fowarded to another number.**
3. **Have the European Commission join the Council of Europe in the development of pan-European personal data protection standards.**
4. **Develop a directive that would outline minimum security standards for information systems.**



SOURCE: COMMISSION OF THE EUROPEAN COMMUNITY, BRUSSELS, BELGIUM
GRAPHIC BY SUSAN J. CHAMPENY

EC pitches privacy rules for members

Commission attempts to avoid legal disputes concerning transborder transfer of personal data.

By Barton Crockett
Senior Editor

BRUSSELS, Belgium — The European Commission recently proposed new privacy regulations designed to prevent disputes over transborder data flow from hamstringing pan-European networks.

Some observers say that if the European Commission successfully implements the regulations, the U.S. may have to strengthen its rules governing the way companies use and exchange data about private citizens in order to avoid legal conflicts with Europe.

Causing concern is the fact that differences in national data protection rules have led some countries to restrict transmissions of personal data over international networks.

For example, some Common Market countries have banned the transmission of medical records to Belgium because the country has no data protection laws. The West German government has not allowed corporate information to be communicated to Austria for similar reasons, according to George Papapavlou, a European Commission administrator who helped draft the privacy initiatives.

Papapavlou said that seven Common Market countries now have policies regarding the use and transmission of personal information gathered by businesses and five do not.

The European Commission's new privacy standards are designed to eliminate data protection disputes by creating a common set of rules to which every Common Market country will adhere. Included are rules that would give individuals the right to inspect and change information about themselves in corporate data bases as well as limit the kinds of data firms can collect.

ANI rules

Also proposed are rules that would give callers the ability to suppress automatic identification of their telephone number (see graphic).

"We believe these rules are needed to ensure that no serious barriers to trade arise," Papapavlou said.

European Commission officials acknowledged that it could be months or years before their proposed new regulations are enacted, if they are adopted at all. But if the rules are enacted, some observers argue that they could force the U.S. to change its own data protection policies.

> "We believe these rules are needed to ensure that no serious barriers to trade arise."
>
> ▲▲▲

According to Russell Pipe, publisher of the Washington, D.C.-based newsletter "Transnational Data and Communications Report" and a leading expert on international data protection issues, the development of new pan-European privacy legislation may lead European Community

(continued on page 22)

(continued from page 30)
multimedia should first consider reusing their existing computers and networks, advises Paul Saffo, research fellow at the Institute For The Future, a Menlo Park, Calif., research organization. "[To get established,] new technologies must leverage the existing infrastructure," he says.

Upgrading existing desktop systems to support media-rich applications could prove difficult, warns William Zachmann, president of Canopus Research in Duxbury, Mass. "Users are limited by the average system on the average desk today," he says. "Many existing workstations don't have the disk storage, bus speed and other features to support multimedia adequately."

One desktop upgrade that would make an immediate difference to users is improved audio, says Rob Lippincott, director of business development in the Information Services Group at Lotus Development Corp. in Cambridge, Mass.

"It's a short step from today's graphical user interfaces to a multimedia video user interface," Lippincott says. "But high-quality audio playback would be something new to the average PC user."

Superior audio hardware is one reason multimedia applications are coming sooner to the Apple Macintosh than to other computing environments, says John Gale, president of Information Workstation Group, a consulting and marketing research group in Alexandria, Va. "What's principally missing from most desktop computers, as regards multimedia, are loudspeakers," Gale says. "The Macintosh, Amiga and NeXT computers already have the speakers built in."

Other personal computer hardware vendors are expected to upgrade the audio subsystems in their products over the next few years, especially when Digital Video Interactive (DVI) — a desktop compression standard developed by IBM, Intel Corp. and Microsoft — is introduced commercially. DVI technology will open the door to new desktop audio/video applications by vastly increasing the amount of digital information that could be stored on CDROM drives.

Multimedia workstations come in various configurations, depending on application requirements. The workstations manage an array of directly attached I/O, storage and processing devices. These can include mouses, microphones, scanners, optical character readers, laser printers, facsimile machines, video cameras, coder/decoders (codec), compression devices, television monitors, CDROM drives, video and audio tape drives, as well as overhead and wall displays.

One of the simplest — some would say simple-minded — multimedia desktop devices is the integrated voice/data workstation, which combines telephone sets, personal computers and modems in one desktop housing. Touted by vendors in the mid-1980s as executive status symbols, integrated voice/data workstations have been largely ignored by the buying public. Even the marketing clout of large systems vendors, such as AT&T and Northern Telecom, Inc., has failed to convince people that such devices are a worthwhile business solution.

Users yawned, asking, "What can an integrated voice/data workstation do that can't be done by a personal computer, modem and feature phone, laid side by side?" This commercial failure should serve as an object lesson to multimedia vendors.

Functional integration in today's multimedia workstations is made possible by advanced operating environments and application development tools. According to Lotus' Lippincott, the ideal multimedia platform is a Unix or OS/2 machine running a graphical user interface, such as the Massachusetts Institute of Technology's X Window System or IBM/Microsoft's Presentation Manager. Multitasking systems such as these are well suited to managing complex data objects and multiple devices in real time, Lippincott says.

> "It's a short step from today's graphical user interfaces to a multimedia video user interface," Lippincott says.
>
> ▲▲▲

The chief advantages of multitasking systems are their considerable internal throughput, processing power and support for multiple concurrent processes.

NeXT bundles a sophisticated graphical user interface and development environment, called NextStep, with its Unix-based multitasking operating system. NextStep lets developers build multiple media into any application, says Kim Orumchian, a developer advocate with NeXT. Any electronic object that can be created with or fed into the NeXT computer — including multifont text, digitized voice, CD-quality sound, scanned images, computer-aided design graphics and motion video — can be plugged into a NeXT application, Orumchian says.

Under NextStep, links can be established between various objects so that, for example, clicking a mouse on someone's name in an electronic mail message displays a picture of that person and plays a recording of that person's voice. This multimedia capability humanizes what would otherwise be an impersonal text message.

NeXT's multimedia messaging technol-

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Digicom preps PC-based modem mgmt. system

Digicom Systems, Inc. (DSI) will introduce this fall a personal computer-based management system for its V.32 rack-mounted modems.

The **DSI/View 9000** software, which runs on an Intel Corp. 80386-based personal computer, will enable users to manage up to 1,600 Digicom modems housed in 16-modem chassis that are daisy-chained together.

The 1,600 total can also include remote modems, but in its current release, the net management system can only monitor the status of the remote devices — such as whether they are on-line — and not track alarms or statistics. The software runs under Microsoft Corp. Windows 3.0.

DSI/View 9000 is expected to be available in September. Users can purchase a personal computer and the software for $7,500 or buy only the software for $5,000.

Digicom Systems, Inc., 279 Sinclair Frontage Road, Milpitas, Calif. 95035; (408) 262-1277.

Scitec mux to support T-1, fractional T-1 speeds

Scitec Communication Systems, Ltd. is planning to announce next month a multiplexer that can combine RS-422 or V.35 data over a single T-1 link or fractional T-1 circuit supporting multiples of 56K or 64K bit/sec channels.

Intelligent Digital Multiplexer (IDM)-FT1 has eight card slots that can be used to support a combination of dual-port RS-422 and V.35 interface cards. The trunk interface can support a full T-1 line or be software-configured to support fractional T-1 speeds.

Customers can use a Digital Equipment Corp. VT-100-compatible terminal to configure port speeds, perform loopback tests and monitor alarms.

Although pricing has not been determined, the company said a single data interface will begin at $4,000. IDM-FT1 is expected to be available by October.

Scitec Communication Systems, Ltd., 26 Valley Road, Middletown, R.I. 02840; (401) 849-4353.

SNMP added to facilities mgmt. pack

By Tom Smith
New Products Editor

PARK RIDGE, N.J. — Network & Communication Technology, Inc. (NCT) is scheduled to announce at NetWorld '90 next month in Dallas a new version of its personal computer-based cable and facilities management product that enables microcomputers to double as Ethernet network management consoles.

Planet 2.0, software for Intel Corp. 80386-based microcomputers, will use the Simple Network Management Protocol (SNMP) to display network alarms generated by Novell, Inc.'s LANtern SNMP agent, an Ethernet monitoring product. Subsequent releases will support other SNMP agents.

Version 2.0 will enable users to analyze and isolate faults, as well as perform standard SNMP management tasks, such as monitoring network status and performance. SNMP is the standard protocol for management of Transmission Control Protocol/Internet Protocol networks.

William Spencer, president of NCT, said the product is built on top of Planet 1.0, software with an SQL-compliant data base for maintaining vendor and equipment information as well as computer-aided design capabilities for graphically representing the user's facilities and network.

SNMP net management products from other vendors do not support the amount of information provided in Planet's data base, nor can they present a sophisticated architectural drawing depicting the local-area network and the floor plan of the building it resides in, Spencer claimed.

Because the product runs on 80386-based personal computers under DOS, it will cost less than Unix workstation-based SNMP products and allow net administrators to work on a hardware platform with which they are more familiar.

The software runs in 32-bit protected mode under a DOS extender, which allows the personal computer to switch between real mode, in which memory is split into 64K-byte segments, and protected mode, which supports a single block of memory.

Although Planet 1.0 supports Ethernet, Token-Ring Network and Arcnet LANs, Version 2.0 will initially just support Ethernet because LANtern only supports Ethernet.

Planet 2.0 is expected to be available by year end. Pricing has not yet been set.

For more information, write to NCT at 24 Wampum Road, Park Ridge, N.J. 07656, or call (201) 307-9000.

Ethernet bridge software helps detect line problems

MARLBOROUGH, Mass. — CrossComm Corp. last week announced a new release of its Ethernet bridge software that enables bridges to detect cable breaks and other physical-layer faults.

The new software, Release 3.0.5, will also eliminate Ethernet broadcast storms that can degrade performance on heavily loaded Digital Equipment Corp. DECnets.

The software runs on Ethernet versions of the company's High Speed Bridges (HSB) and ILAN bridges. A future release will provide this capability for the company's token-ring bridges.

Focus on the physical layer

According to Tad Witkowicz, president of CrossComm, roughly 50% of all Ethernet problems occur at the physical layer, making it important to be able to detect cable breaks and bad terminations.

The software will enable the CrossComm bridges to detect Ethernet faults by monitoring for packets that cannot be delivered, either because of faulty cables or excessive collisions.

In either scenario, the software will generate an alarm, which is passed to the ILAN Management System, CrossComm's personal computer-based management system. The alarm could also be passed to ExpertWatch, the company's remote net management service, or to IBM's NetView via NetView/PC.

The software detects cyclic redundancy check errors, which help net managers determine if there are an excessive number of corrupted packets. It also detects excessive broadcast packets, which can reduce the bandwidth available for data transmission.

The software can prioritize actual data packets and broadcast "hello" messages, which inform the network that a certain node is able to receive data, Witkowicz said, giving higher priority to data packets.

(continued on page 52)

Wyse Unix server can support 8 CPUs

Series 9000i Model 940 performs true symmetric multiprocessing, dividing all tasks between CPUs.

By Tom Smith
New Products Editor

SAN JOSE, Calif. — Wyse Technology last week introduced a dual-bus, true symmetric multiprocessing Unix server for its Series 9000i line that can be configured with as many as eight Intel Corp. 80486 microprocessors.

The Series 9000i Model 940 supports directly attached ASCII terminals and Ethernet local-area networks. The device also supports the Transmission Control Protocol/Internet Protocol, Wyse's implementation of Sun Microsystems, Inc.'s Network File System and the Serial Line Interface Protocol for asynchronous serial lines.

The processor is designed to function as a data base server or a server for applications such as inventory tracking or factory floor automation.

The buses in the system include an industry-standard 32-bit, four-slot VMEbus for off-the-shelf products, such as Ethernet and X.25 interfaces, and a seven-slot proprietary 64-bit system bus for 80486 CPU cards and memory expansion cards in 16M-byte increments.

Maximum system memory is 64M bytes. The system bus can also house a two-channel Small Computer System Interface (SCSI) adapter supporting as many as 14 peripherals, such as hard disk or tape drives.

> The processor is designed to function as a data base server or a server for applications.
>
> ▲▲▲

The product's hard disk capacity is 15G bytes. The company offers hard disk drives with capacities ranging from 200M to 780M bytes.

The Model 940 can execute a total of 100 million instructions per second (MIPS), or 12.5 MIPS per 25-MHz 80486 CPU. It can support 300 users concurrently.

The product runs Unix System V Release 3.2, with Wyse enhancements that support functions such as dynamic load balancing to exploit the server's true symmetric multiprocessing capabilities. True symmetric multiprocessing allows any task to be divided between processors. With symmetric multiprocessing, by contrast, only certain tasks can be divided between processors.

The multithreading capabilities of Wyse's Unix implementation divides instructions for a specific task between the available processors. This ensures that as the number of processors doubles, the throughput the user sees doubles as well.

> True symmetric multiprocessing allows any task to be divided between processors.
>
> ▲▲▲

Wyse first announced support for true symmetric multiprocessing when it announced the Series 9000i Model 920 last January. That server supports as many as six 20-MHz 80386 CPUs and up to 128 users.

Concurrent with the release of the Model 940, the company upgraded its operating system to support true symmetric multiprocessing on the 80486 server.

The Model 940 is one-third to one-half the price of true symmetric multiprocessing offerings from Sequent Computer Systems, Inc. and Pyramid Technology Corp., Wyse claimed.

Pricing for the Series 9000i Model 940 ranges from $45,000 to $215,000. An entry-level configuration with 8M bytes of memory and a 200M-byte hard drive costs $45,000.

The system is available now.

Wyse is also offering an 80486 upgrade board for the 80386-based Series 9000i Model 920, the company said. Users can utilize both 80386 and 80486 processors in the Model 920.

The company sells its products through distributors. For this reason, it will not quote prices on 80486 upgrade boards, the SCSI adapter or system memory boards.

Wyse can be reached by writing to 3471 N. First St., San Jose, Calif. 95134, or by calling (408) 473-1200.

Here's your chance to ta

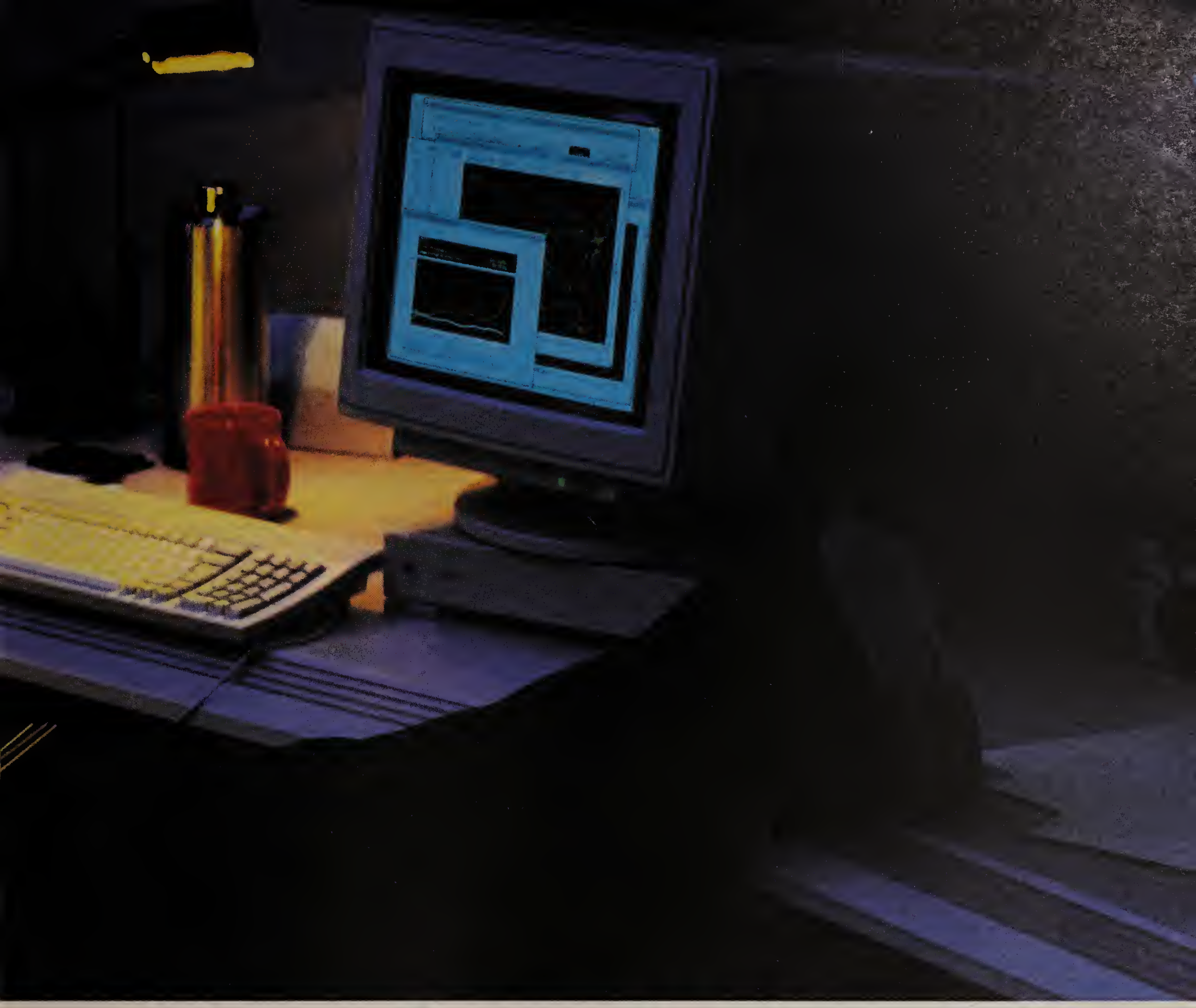
With our new ACCUMASTER® Services Workstation, you can reconfigure your AT&T 800 Service, SDN or ACCUNET® Digital Services networks without any help from us.

If you're an AT&T customer, you could be in a position of real power: sitting in front of the new ACCUMASTER Services Workstation.

The ACCUMASTER Services Workstation is an enhanced-graphics terminal with so much capability it lets you reconfigure your AT&T traffic any way you want, to reroute around trouble and juggle heavy volume.

Say you have a flood of 800 calls going through your Northeast telemarketing center when a real flood causes your PBX to go down. Just by clicking your mouse, you can redirect 70% of the endangered calls to your West Coast center and the remaining 30% to your Midwest. (Or whatever split you decide on.) Without any help from us, you just saved your company valuable 800 calls that might otherwise have been lost.

Here's something else the ACCUMASTER Services



ke total control of AT&T.

Workstation can save you. Money. By letting you consolidate your existing and future services into a single workstation, it cuts down on the equipment you need to run your network.

So if you'd like to manage your network more effectively, give us a call. By letting you control a piece of our business, we can probably help you run yours better.

Network Control. Another AT&T advantage.

For more information on the ACCUMASTER Services Workstation, call your AT&T Account Executive or 1 800 NET-MGMT.

AT&T

The right choice.

OPINIONS

DATA BACKUP

BY WILLIAM TREACY

Networking holds the key to central data backup

How can essential data contained in dispersed computers be protected? One way is to put up signs and send out memos that say, "Back up your data before you leave." And then hope and cross your fingers. The unfortunate result, however, is that when everyone is responsible, no one is. One reason for this lack of responsibility is that the users are not data processing personnel with full-time responsibility for a computer system. Their jobs are to design airplane wings or open new accounts or any number of other functions. These users consider the computer a simple tool, not a machine that needs coddling. Performing common DP procedures such as backup takes time away from primary work responsibilities.

> With a network in place, backup procedures are much easier to implement.
>
> ▲▲▲

Another reason is they don't have the peripherals to back up data efficiently. A DP center has expensive, high-speed tape drives that can back up data quickly. Such drives cost about $150,000 and can copy an entire day's data in minutes. There generally isn't a budget to provide a tape drive of that capacity for every geographically dispersed location, so backup in those locations can take a couple of hours daily.

A third reason for lack of backup is that there is not a standard process that is followed every day in the minicomputer locations. If there is a person responsible for backup — and that's a big if — he or she may be sick, on vacation or called to another task that is of more immediate importance. Since the least senior person is probably selected for the backup task, that person may be the first to be displaced when budgets get tight. In addition, in a multivendor environment, each vendor's machine may have a different means of backup.

While decentralization of computer resources has its advantages, the backup problem calls for a central policy and procedure. For many companies, the solution lies in networking. Tying together workstations, networking the workstations with minicomputers and then networking the minicomputers to the central mainframes gives users a great deal of flexibility.

Today, the technology exists for computers from virtually any vendor to be networked. A workstation can communicate with a Digital Equipment Corp. VAX, an IBM System/370 or a Cray Research, Inc. supercomputer using the workstation's own commands and protocols.

Networks strengthen the power of every workstation and computer on the network. Resources can be allocated where they are most needed without moving or buying more computer power. The network can also allow any computer on the system to use the best peripherals available for a given task.

With a network in place, backup procedures are much easier to implement. Backup becomes the responsibility of the DP center. That data center has the peripherals, standard procedures and professional DP personnel to institute a regular backup process. A centralized backup procedure ensures that responsibility is clearly designated and that it is designated to people for whom backup is top priority. With high-speed tape or optical disk drives, the backup function can pull data quickly from the entire network in a continuous stream. And data can be sent from one central location to the remote vault site.

Centralized archiving of data ensures that the job will be done right every business day. Is that important? It depends on how important your data is.

Treacy is president of TMD Consulting, Inc., a consulting firm in Edina, Minn.

NETWORK WORLD

Editor
John Gallant

Executive Editor
John Dix

Assistant Managing Editor — News
Charles Bruno

Senior Editors
Bob Brown — Industry Update
Jim Brown — Data Communications
Barton Crockett — International Networking
Paul Desmond — Data Communications
Laura DiDio — Local Networking
Bob Wallace — Telecommunications

Senior Writer
Wayne Eckerson — Management Strategies

New Products Editor
Tom Smith

West Coast Bureau
Susan Breidenbach — Bureau Chief
(415) 771-3530
Walter Sweet — Correspondent
(415) 771-4103
2088 Union Street, Suite 2
San Francisco, Calif. 94123

Washington D.C. Bureau
Anita Taff — Bureau Chief
(202) 347-6184
Ellen Messmer — Correspondent
(202) 347-4180
650 National Press Building
529 14th Street NW
Washington, D.C. 20045

Features Editor
Steve Moore

Associate Features Editor
Bruce Guptill

Features Writer
Salvatore Salamone

Assistant Features Editors
Alison Conliffe
Susan Collins

Art Director
Dianne Barrett

Informational Graphics Designer
Susan Champeny

Junior Graphic Designer
Susan Slater

Assistant Managing Editor — Production
Beth Khoury

Associate Editor
Joanne Cummings

Copy Editors
Liz Pappas
Michelle Beaulieu
Karen Moltenbrey

Assistant to the Editor
Cheryl Tynan

Editorial Assistant
Tracie Seder

Contributing Editors
Daniel Briere
James Kobielus
Edwin Mier
Alan Pearce

President/Publisher
Gary J. Beach

Director of Financial Operations
Mary Fanning

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400
MCI Mail — 390-4868
FAX: 508-820-3467

An IDG Communications Publication

EDITORIAL

User cooperation pays off in big dividends

A recent news story illustrates once again how users can benefit by teaming up to solve problems that they have in common.

Twenty-eight firms have begun beta-testing an expert system-based help desk tool that they designed collectively ("Users unite to design own help desk tool," *NW,* July 30). The software, dubbed Helpdesk Expert Automation Tool (HEAT), was architected by a consortium of U.S. and Canadian companies and developed by Bendata Management Systems, Inc., a software development firm in Colorado Springs that helped organize the consortium.

By working together, members of the consortium were able to develop a help desk automation tool with capabilities not offered by existing products. The software, which will be sold commercially, will meet their needs because it was designed with their needs in mind.

We applaud the members of the HEAT consortium not only for designing what promises to be an exceptional product, but for showing what users can accomplish when they pool their expertise and knowledge. While their businesses may be very different, users face many network problems that can often be resolved through joint action.

A variety of opportunities

Today, users have a variety of opportunities to get involved in shaping the future of virtually every technology, as well as to steer public policy. These opportunities include participation in broad-based professional groups, such as the International Communications Association, the Tele-Communications Association, Inc., as well as product- or technology-specific users groups such as the Independent T-1 Users Group.

In addition, users can help accelerate the move to open systems through involvement in such groups as the Corporation for Open Systems International, the MAP/TOP Users Group or the fledgling group known now as the Houston 30, a coalition of major users formed to break down the obstacles blocking deployment of open systems ("Managers unite to conquer open systems problems," *NW,* June 25).

But too many users fail to take advantage of these opportunities and are content to gripe about slow deployment of products, suppliers not meeting their needs or too much vendor involvement in the standards-setting process.

Many don't realize how much influence they can wield through active participation in such formal and informal group efforts.

The message is an old one, but the HEAT consortium proves again that it rings true: Get involved; it pays off.

OPINIONS

Do network users really need T-3's high bandwidth?

PRO:

By JAMES CASTLE

A good network planning axiom is "Never say never to any new technology." In other words, always leave your options open. In keeping with this philosophy, today's network managers should plan now to start migrating their nets to T-3 because, in spite of apparently slow market maturation and problems with its tariffing, T-3 is going to take off soon.

Telephone companies, bypass carriers and interexchange carriers all say that T-3 will mimic the skyrocketing T-1 market and that if you're not onboard today, you could get burned. But commercial users identify cost, availability and application requirements as reasons for a cautious approach.

Driven by the need for increased bandwidth, the T-1 market quickly moved from point-to-point networks to full mesh nets. The economics for migration to T-3 will slow market maturation, however, giving users the opportunity to move up link-by-link, and move up they will.

Point-to-point and ring architectures are more than adequate for satisfying the present and near-term T-3 networking needs of corporate users while providing the reliability and quality management necessary for such complex networks.

In fact, today's most aggressive T-3 users require only point-to-point connections with an average of five T-3 links per network. The rest of the network traffic is handled by full mesh T-1 networks running over a T-3 backbone to smaller branches or remote nodes.

On the commercial side, however, only those users with large traffic cross sections between two locations (more than eight to 15 T-1s, depending on interexchange carrier, local exchange carrier and distances, either between cities or from the company to the local carrier's central office) can cost-justify replacing those T-1 links with a single T-3 facility.

Justifying T-3 costs is further complicated by the Federal Communications Commission's interest in having carriers publish T-3 tariffs. This in-

(continued on page 49)

Castle is chairman, president and chief executive officer of Infotron Systems Corp., a Cherry Hill, N.J.-based manufacturer of communications equipment for public and private networks.

CON:

By KEN GUY

Any discussion of T-3, T-1 or even fractional T-1 eventually comes down to just one issue: How much bandwidth for how many bucks. With regard to T-3, network managers don't need to start implementing expensive T-3 transmission lines yet because by using the latest compression techniques, most applications would not require T-1 lines, let alone T-3.

In the wide-area network world, you pay for bandwidth each month, every month, for the life of the network. For example, a WAN link from Chicago to New York over three years will cost (undiscounted) about $3,135,600 for T-3 bandwidth, $342,000 for T-1 and about $52,000 for one 64K bit/sec fractional T-1 line. These are significant expenses for most companies, compelling them to manage bandwidth consumption carefully and buy only the minimum bandwidth necessary for each application. Conserving and even reducing bandwidth requirements, therefore, is an important goal for many companies.

The first step to bandwidth conservation or reduction is to identify the bandwidth-consuming culprits. Voice circuits are always near the top of the list, as each voice circuit using pulse code modulation consumes 64K bit/sec. A voice circuit carrying facsimile traffic also consumes 64K bit/sec, even though the fax only runs at 9.6K bit/sec. Computer-to-terminal traffic is only a moderate bandwidth consumer, usually needing 9.6K to 38.4K bit/sec per cluster controller or statistical multiplexer.

Video communications, however, can consume from 700K to 1M bit/sec and more, and LAN-to-LAN traffic is becoming a significant consumer, often requiring 64K to 256K bit/sec. Above all, though, voice is still the major consumer, using about 70% of a WAN's T-1 bandwidth in most applications.

The key issue is to focus on reducing the 64K bit/sec used by a voice or fax circuit. For some time now, it has been possible to do just that, at-

(continued on page 49)

Guy is vice-president of corporate strategy and business development at Micom Communications Corp., a supplier of communications equipment and network systems located in Simi Valley, Calif.

TELETOONS

BY FRANK AND TROISE

LETTERS

Novell's CNE defended

In his column titled "Certified NetWare Engineer: hitting a fast moving target" (*NW,* April 23), Rick Utley misses the point concerning Novell's Certified NetWare Engineer (CNE) program.

Utley writes, "You never receive a copy of the questions . . . " Of course the candidates never receive a copy of the questions; if they did, the questions would be widely circulated, thus making the "challenge" tests meaningless.

Utley also states, "The introduction to data communications test has the most incredible reputation of all. I once talked to a certified Novell instructor who failed that test twice . . . What a marketing concept. Let's see, at $70 a pop just to take the test, that's . . . wow!" My understanding is that Novell does not receive any remunerations from the Plato testing centers.

The final point of contention in the article surrounds Novell's adding requirements to the CNE program. Novell does not require candidates to attend the courses simply to demonstrate their understanding and command of the technology as measured by pass-

(continued on page 49)

Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *161 Worcester Road, Box 9172, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

TIME WILL CHANGE AND EVEN REVERSE many of your opinions, according to Plato. So don't wait too long to write that column for *Network World.*

Columns should be 600 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you'd like to write a column, call Steve Moore, features editor, at (508) 820-7439 or fax your idea to us at (508) 820-3467.

MONO

Traditional PC LAN

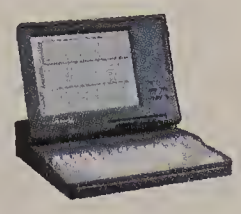
vs. MULTI

PC LAN with AViiON Server

Call 1-800-DATAGEN to learn how Data General and Novell NetWare let your PC LAN do more.

Data General has a host of Novell Portable NetWare® solutions that let your existing PC LAN run multiple applications simultaneously. Novell Portable NetWare on a Data General AViiON™ gives your PC LAN the power to share MS/DOS®, OS/2®, MAC/OS®, and UNIX® files. The power to cruise through MS/DOS, OS/2, and UNIX applications. And, the power to share peripherals.

Data General's NetWare for AViiON is the first RISC-based NetWare platform. It's fully scalable and can share the server with major standards like TCP/IP. It also uses the standard NetWare client software and Novell's IPX/SPX Networking Protocol, so it interoperates with existing Novell LANs. It lets users access scores of applications. And, Data General offers a Software Developer's Kit to facilitate the development of client-server applications.



Data General's line of Novell NetWare solutions brings transparent networking and distributed applications to all your PC clients.

To learn more about how an AViiON server with Novell's Portable NetWare can bring more power and more applications to your LAN, call the distributors listed below or 1-800-DATAGEN. Also, ask about Data General's full line of PCs.

Data General

3400 Computer Drive, Westboro, MA 01580

See The FAXNeT Form on Page #17

DATA GENERAL'S NOVELL NETWARE DISTRIBUTORS

GATES/FA Distributing
121 Interstate Blvd.
Greenville, SC 29616
Sales: 800-332-2222
Custamer Suppart: 800-332-2299
Technical Suppart: 800-332-2315
Credit: 800-332-3497

Western Microtechnology, Inc.
Natianal Sales Office: 800-634-2248

1637 Narth Brian Street
Orange, CA 92667
(714) 637-0200

6837 Nancy Ridge Drive
San Diega, CA 92121
(619) 453-8430

28720 Raadside Drive
Agaura Hills, CA 91301
(818) 707-0377

20 Blanchard Road
Burlingtan, MA 01803
(617) 273-2800

264 Passaic Avenue
Fairfield, NJ 07006
(201) 882-4999

14636 N.E. 95th Street
Redmand, WA 98052
(206) 881-6737

12900 Saratага Avenue
Saratага, CA 95070
(408) 725-1660

1800 N.W. 169th Place
Beavertan, OR 97006
(503) 629-2082

2545 Tarpley Road
Carralltan, TX 75006
(214) 416-0103

Faur Eves Drive
Marltan, NJ 08053
(609) 596-7775

Trends and TECHNOLOGIES RESHAPING networks: www

Multimedia integration

Multimedia goes mainstream

The latest technology gives users access to rivers of information at the desktop.

CONTINUED FROM PAGE 1
stations. In addition, users are implementing high-capacity digital transmission facilities, such as Integrated Services Digital Network and Fiber Distributed Data Interface connections, to support the enormous bandwidth requirements of future multimedia data streams.

Multimedia as a catalyst

Multimedia technology radically expands applications' ability to deliver information in the most effective medium or combination of media.

Multimedia is not a particular set of technologies or products. Rather, it is an approach to building network and standalone applications.

Multimedia network applications contrast sharply with traditional telephony and computer applications, which generally limit users to a single medium — voiceband audio and character-mode data, respectively.

Multimedia is a catalyst, accelerating integration of diverse technologies, according to Brian Jeffery, managing director of International Technology Group (ITG), a consulting firm in Los Altos, Calif.

Kobielus, a contributing editor to Network World, *is a telecommuntcations analyst with Network Management, Inc., a Washington, D.C.-based consulting firm.*

Building multimedia network applications can turn into a major feat of roll-up-the-sleeves systems integration. Multimedia systems bring together application domains — voice, data, image and video — that traditionally have stood apart. The glue uniting these disparate realms are standards — some existing, others still in the making.

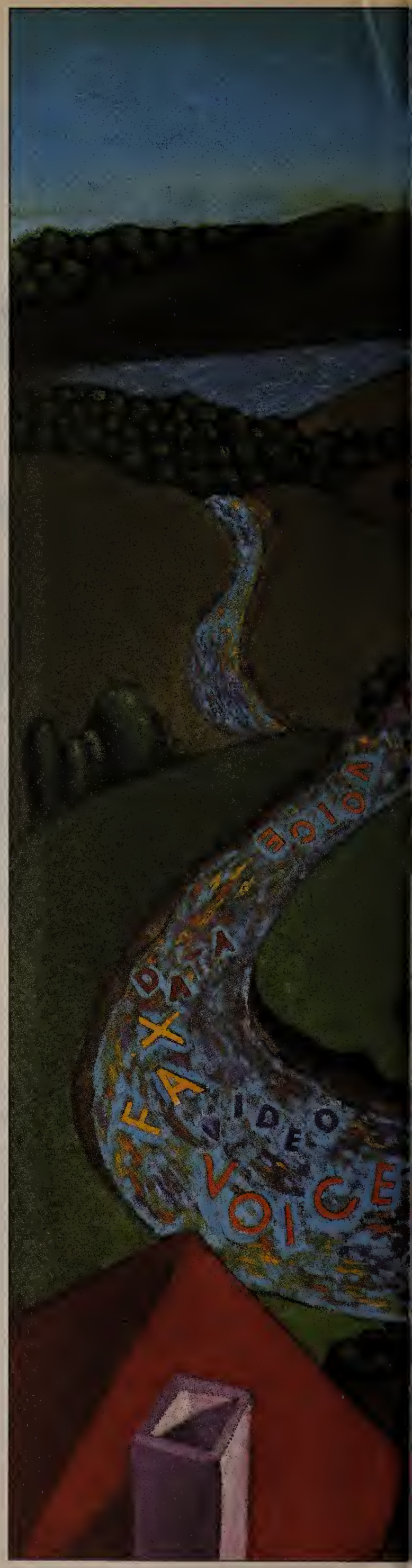
Implementing multimedia applications on networks requires that the enabling technologies be positioned at strategic locations: at the desktop, at the server, host or switch, and on the network backbone.

At the desktop

One common misconception is that multimedia requires state-of-the-art desktop machines such as NeXT, Inc.'s NeXT Computer System and Commodore Business Machines, Inc.'s Amiga 3000. These computers — with their high-resolution displays, audio speakers, specialized sound and video processors, fast system buses, high-volume mass storage, multitasking operating systems and sophisticated application development tools — are certainly optimized for multimedia applications.

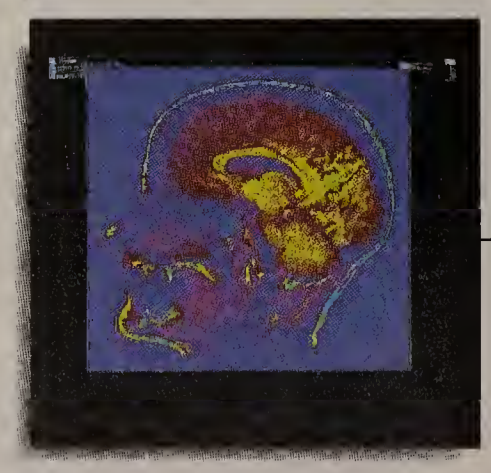
However, the same capabilities can be provided in more popular computing environments, such as Apple Computer, Inc.'s Macintosh operating system and Microsoft Corp.'s MS-DOS. In fact, users exploring

(continued on page 34)




DATA
FAX
VIDEO
DATA
VIDEO
COM

Now send 10 times more data every second with Digital's Ethernet and FDDI solution.



Ethernet 10 Mb/sec.

digital™

Announcing a Digital innovation that boosts throughput between Ethernet LANs by a power of ten.

It's our combined Ethernet/FDDI solution.

The best Ethernet solution made even better.

802.3 Ethernet is the most widely used LAN technology in all the land. And Digital has been Ethernet's leading innovator for as long as there's been an Ethernet.

For example, our LAN Bridge 200 spans new levels of performance. Our DECserver™ family has set the de facto standard in terminal servers. And our DECconnect™ family has all the cabling options you need to get your network really wired.

But with FDDI, the best in Ethernet just got better.

FDDI. The cure for LAN locked data.

FDDI is the fiber optic standard that sets new standards for performance. Offering data rates of up to 100 Mb/sec.

With Digital's FDDI and Ethernet adapters, you can network workstations, servers and storage devices for fast, fast performance. Which makes our solution perfect for network-intensive, high-bandwidth applications like graphics, compound documents, high-speed access to distributed databases, and imaging–for example, the Integrated Image Management system from SMS shown in this ad. And our Ethernet/FDDI solution supports all workstations that comply with DECnet,™ OSI and TCP/IP networking standards.

So advanced is all this advanced networking technology that it serves as the foundation for Digital's ground-breaking Network Application Support (NAS), a comprehensive set of software that enables applications integration across a distributed multi-vendor environment. Customers are now able to build network applications using NAS solutions, and be assured of long-term stability and compatibility, even when new technology evolves.

Higher intelligence for management.

Digital's Ethernet/FDDI is the intelligent way to send data faster. And DECmcc™ network management software is the intelligent way to manage your Ethernet/FDDI network faster. DECmcc software has built-in intelligence, so it makes short work of long hours of network maintenance. All from any workstation in the network. All with the ease of our DECwindows™ graphic interface.

The performance leader in open networks.

Our new FDDI products are just one example of Digital's leadership in networking. With our tradition of technological innovation, intelligent network management, and a steadfast commitment to open standards, Digital's networking gives you a way to tie your company together, without tying you down.

For more information, call your local Digital sales office or 1-800-343-4040, ext. 194.

Digital has it now.

Digital's Ethernet/FDDI, 100 Mb/sec.

EC pitches privacy rules for members

continued from page 21

countries to restrict the transmission of personal data to countries such as the U.S. that lack a cohesive, nationwide personal data protection policy.

This could pressure the U.S. to develop new data protection laws that mirror those in Europe, according to Eli Noam, a former member of the New York State Public Services Commission and professor at the University of Columbia in New York. Already, fear of potential trade problems has moved one congressman, Rep. Bob Wise (D-W. Va.), to propose new data protection legislation.

Most observers caution, however, that Wise's bill has little chance of passage.

According to Edward Regan, vice-president of telecommunications at Manufacturers Hanover Corp., disputes over differences in national data protection laws have had little, if any, impact on trading activities overseas.

Regan said concern stems from the possibility that disputes could snowball into serious trade problems. But Regan said U.S. companies have seen little to make them believe this would happen.

In addition to his duties with the bank, Regan serves as chairman of the Telecommunications and Information Policy Committee of the U.S. Council for International Business and is author of the book *Emerging Transborder Data Flow Issues and Their Impacts on International Banking* (Ann Arbor, Mich.: University Microfilms, Inc., 1984).

Regan conceded that the adoption of a consistent set of data protection regulations throughout Europe would make it easier for U.S. companies to do business there by minimizing differences in national legislation, which in turn would ease compliance. He added that consistent regulations for caller identification could make it easier to deploy that application throughout the continent.

But Regan cautioned that new broad-based data protection regulations would be seen as an unnecessary bureaucratic intrusion in the U.S., where companies have grown accustomed to dealing with more limited privacy regulations for specific issues, such as credit reports.

Report gives users insight into nets

continued from page 21

process" of implementing or expanding an international network, said Richard Lane, senior manager of Peat Marwick's telecommunications industry consulting practice and head of the North American research section.

If not, the network may not meet the company's needs. For example, the net may not provide sufficient capacity or it may be too sophisticated for the applications supported. "Several companies have learned that the hard way," he said.

Lane said that a vital part of planning for an international network is determining what types of equipment can be installed in the nations the net will serve. He said one company interviewed for the study found that half of the equipment needed for its network could not be used in one country.

For that reason, many of the companies interviewed are using mainstream technologies in their international networks. Few companies want to be on the cutting edge of technology when it comes to installing and maintaining a network abroad.

Few companies want to be on the cutting edge of technology when it comes to installing and maintaining a network abroad.

▲▲▲

stalling and maintaining a network abroad, he said.

Lane said users surveyed recommended against having representatives of U.S. companies deal with post, telegraph and telephone administrations abroad. Instead, they suggested enlisting the aid of local network professionals to negotiate with PTT officials, who are more open to dealing with people from their own country than with outsiders.

It's also important for users to follow regulatory changes in countries around the world to determine how they could affect business. "It seems every couple of days, things are changing drastically," Lane said.

Chris Wilmott, who led the European research team, said the most effective global networks serve all levels of the corporate organization, enabling workers in every department and business unit to communicate easily with one another.

Armed with such a comprehensive global network, employees are able to share resources and information while working together more efficiently. That can provide a company with a powerful business edge.

For example, he said DEC officials told Peat Marwick that employees in one site were struggling to resolve a customer's problem. After describing the problem on the companywide bulletin board, DEC quickly received four viable solutions to assist the customer. "Telecommunications helps you use your resources, wherever they are," Lane said.

The "Global Networking Report" may be obtained from Peat Marwick for $50,000. For more information, contact Lane at 150 John F. Kennedy Pkwy., Short Hills, N.J. 07078, or call (201) 912-6384.

ogy could become a de facto industry standard. IBM was so impressed by the NextStep environment that Big Blue licensed it for its own line of Unix-compatible

multitasking workstations.

Specialized workstations, a la NeXT, aren't always necessary for multimedia. When multimedia applications are provided over networks, some functions can be assigned to specialized servers and host processors that interwork via cooperative processing. In such cases, existing desktop devices — telephones, personal computers, fax machines and so forth — may be adequate or require only limited upgrade.

For example, inbound voice-call support, which automatically displays a data file associated with an incoming phone call, often works with existing telephone sets and data terminals. When multimedia applications are provided over networks, some functions can be assigned to specialized servers, host processors or switching systems that interwork via cooperative processing.

Integrated voice/data, which is based on tight integration between voice switches and multi-

Document image management is a popular multimedia network application.

▲▲▲

user computers, represents one of the "killer applications" of ISDN. Major systems vendors have positioned themselves for ISDN by developing proprietary specifications for linking PBXs and host computers (see "Strengthening the PBX-computer bond," page 37).

ANSI is developing an open industry standard — the Switch/Computer Applications Interface — for allowing PBXs and computers to support integrated voice/data applications.

Document image management is a commercially popular multimedia network application. This enables banks, for example, to retain scanned images of customers' checks in optical storage and to discard the originals. Document image management is often provided through several specialized servers and workstations connected to a local-area network. A typical LAN configuration has machines dedicated to separate functions such as scanning, character recognition, optical mass storage, high-resolution display, editing and color printing. Leading vendors in this market include Eastman Kodak Co., FileNet Corp. and Wang Laboratories, Inc.

Integrated voice/data represents one of the "killer applications" of ISDN.

▲▲▲

Increasingly, image management vendors are linking their systems to corporate data bases stored on mainframes and minicomputers. Such links could, for instance, enable design engineers to display in one window a functional product specification downloaded from a remote host data base management system, and, in another window, a bit-mapped design sketch pulled from the local image server.

Tomorrow's server will support software that manages creation, editing and retrieval of compound documents containing text, graphics, scanned images and other data types. A growing assortment of commercial network-oriented office automation systems provides this capability. Standards to watch in this area include DEC's Compound Document Architecture (CDA) and an application-layer Open Systems Interconnection specification, known as Office Document Architecture (ODA).

DEC's CDA is more sophisticated for multimedia applications than ODA, says document management guru Jonathan Seybold, president of Seybold Seminars in Malibu, Calif., and Seybold Publications in Media, Pa.

"CDA supports a wider variety of data types," Seybold says. "ODA comes from an office word processing orientation in which the most common data types are text and computer-generated graphics."

Another advantage of CDA, according to Seybold, is its support for live links between applications and documents across networks. "Live links let users choose to have data from one application automatically update a document in another application on another networked computer," he says.

Commercial DBMSs are being upgraded to support multimedia objects in addition to alphanumeric text. Already, some well-known LAN relational DBMS vendors — including Informix Software, Inc. and DataEase International — have incorporated multimedia support into their products.

What distinguishes multimedia DBMSs from their character-oriented cousins is support for an additional data type — binary large objects. A binary large object is an unstructured digital object, such as a satellite feed, video clip or program source code, that can sprawl over many megabytes of disk and memory space. Its great size notwithstanding, the object appears to the DBMS as just another field that can be indexed, manipulated and retrieved using standard means, such as SQL commands.

Of course, multimedia DBMSs must be engineered to keep these binary behemoths from using all of the available storage, memory and processing capacity. Generally, binary large objects are written to a separate disk subsystem from the main data base. The object is represented in the data base by a pointer to its physical location. This system design enables the DBMS to handle the object efficiently without slowing performance of standard data base functions.

Data-intensive multimedia applications are forcing changes to the internal plumbing of networks. Users are installing high-capacity network-interface technologies in LANs, metropolitan-area networks and wide-area networks to prepare for the expected order-of-magnitude increase in the flow of digital information.

"Multimedia applications chew up bandwidth like Godzilla," says ITG's Jeffery. Desktop multimedia systems of the future will routinely transmit multimegabyte data files and screen images across networks, he predicts.

Managing these massive data flows will require a balance between high-capacity digital transmission circuits and powerful compression algorithms, says Ian Angus, president of Angus Tele-Management Group, Inc., a research and consulting firm in Pickering, Ontario. "The data processing industry's approach has always been to widen the transmission pipe," Angus says, "while the telecommunications industry has preferred to compress the data." Both approaches to throughput management are valid and are being employed to varying degrees in multimedia systems.

Bandwidth hunger is causing users to consider many high-capacity digital transmission technologies whose acronyms have been littering the trade press for years. The preferred multimedia LAN interface, according to many industry observers, is FDDI, which provides an aggregate raw data rate of 100M bit/sec over dual counter-rotating fiber-optic rings.

For metropolitan-area nets, the multimedia pipe will probably be FDDI or a related fiber-optic standard such as Distributed Queue Dual Bus, which conforms with IEEE 802.6. Commercial carriers are basing their switched multimegabit data service offerings, scheduled for introduction over the next several years, on IEEE 802.6.

On the WAN front, users are looking beyond today's megabit transmission technologies to the promised gigabit and terabit networks of the near future. Full-blown multimedia networks will require much more bandwidth than currently provided by T-1 and narrowband ISDN, both of which have a maximum aggregate data rate per circuit of 1.544M bit/sec, say many experts. Serious multimedia networks will require bandwidth at T-3 levels and above. Down the road, users will be looking to Synchronous Optical Network transmission systems for gigabit transmission rates.

"Multimedia applications chew up bandwidth like Godzilla."

▲▲▲

Throughput at multimegabit levels will require switches, multiplexers and other transmission devices that incorporate frame relay technologies, says Mary Johnston-Turner, a principal at Northeast Consulting Resources, Inc. in Boston. Frame relay transmission achieves high throughput by means of flexible data packets and streamlined end-to-end error checking, as well as

(continued on page 36)

Today's multimedia applications

Most business multimedia systems to date are stand-alone, personal computer-oriented applications using CDROM for on-line mass storage and retrieval. A popular application development approach is "hypermedia," which lets users navigate flexibly between information presented in graphics, text, audio, animation, live-action video and other formats.

Still, there is a wide spectrum of multimedia network applications in use, ranging from those that concurrently provide users with several media to applications that involve just two media, such as integrated voice and data.

A good example of the former is multimedia videoconferencing. These media-rich systems convey much more than just the faces and voices of communicating parties. The same coder/decoder that carries real-time video and audio feeds can also be configured to pass computer-generated overhead slides, word processing documents and computer-aided design drawings. In this way, electronic conferences can approximate the full range of information sharing that goes on in a face-to-face meeting.

Multimedia messaging systems provide the ability to wrap a text-based envelope around a variety of electronic attachments, including facsimile, optical scanner images, voice mail, vector graphics and executable program code. The whole package can be transmitted as a single electronic mail message.

At the other end of the multimedia spectrum are dual-media applications, such as integrated voice/data. One of the more popular voice/data applications is inbound voice support. Under this application, an Integrated Services Digital Network-like toll-free voice service forwards the calling party's number to the telemarketing bureau's private branch exchange, which then signals a host computer to display for the waiting operator a customer data file or sales script appropriate to the caller.

— Jim Kobielus

(continued from page 35)
flow control techniques.

Multimedia applications will make it very difficult to forecast network bandwidth requirements, Johnston says, because loading characteristics differ considerably from the traditional voice network. "One difference is that multimedia network connections have longer holding times," she explains. "Also, we have no model for predicting the flows of multimedia documents between dispersed users."

Johnston predicts that users will call on commercial telecommunications carriers to handle unforeseen and peak-hour loads from multimedia applications. "If [user company] network planners could predict the loading, they could build rough-and-ready networks to support it," she says. "But this would be expensive and would inevitably give some users poor performance [due to the difficulty of forecasting multimedia traffic on a link-by-link basis]. Consequently, users will be looking to high-speed, switched, commercial digital services to pick up some of the overflow."

Critical compression

Data compression technologies are also critical to the cost-effectiveness and feasibility of multimedia network applications. Compressed data streams can be sent over less expensive, lower bandwidth transmission facilities. The growing popularity of videoconferencing technologies, for example, may be attributed in part to recent advances that squeeze full-motion video into 384K bit/sec and send freeze-frame video to the desktop over a 64K bit/sec circuit.

Real-time multimedia network applications require symmetric compression techniques, says Michael Liebhold, manager of media tools and applications for Apple in Cupertino, Calif. Symmetric techniques operate on the fly, taking just as many computer processor cycles to compress data as to decompress it, he says. Videoconferencing codecs, for example, employ two-way symmetric compression and decompression.

Two symmetric data compression standards — one for full-motion video, the other for video stills — are being developed by the International Standards Organization. Liebhold predicts that when these standards — the Motion Picture Expert Group and Joint Photographic Experts Group specifications, respectively — are completed, possibly as soon as 1991, they will be rapidly incorporated into multimedia systems.

DVI is unsuited to network applications, according to Liebhold, because it compresses data off-line. DVI, an asymmetric compression technology, can require more than 100 hours of computer time to compress one hour of full-screen, full-motion audio and video onto an optical disk. Data is decompressed in real time at the workstation by a special Intel DVI chip.

The job ahead

At many companies, the infrastructure for multimedia network applications has yet to be built. It's a massive job that will require the implementation of expensive, sophisticated and largely unfamiliar technologies on the desktop, server, host computer, phone switch and network transmission backbone. Systems professionals will have to learn new technologies and standards that unite the various application domains — voice, data, image and video — whose distinctness they have long taken for granted.

Johnston predicts users will call on commercial telecommunications carriers to handle unforeseen loads from multimedia applications.

▲▲▲

Without a large commercial track record of multimedia benefits, pioneering users may have to justify these investments on the basis of faith or vision. In some cases though, multimedia technologies won't be a hard sell into the corporate world; the technology has already captivated the popular culture as a "sexy" end-of-the-century topic.

A strong business case can be made for multimedia as a means for quickening the corporate information world's metabolism and sharing information that's long been confined to separate technological realms. Multimedia technologies encourage information sharing by consolidating user access to electronic and nonelectronic media.

An integrated multimedia workstation can replace the confusing and expensive array of separate devices — such as telephones, data terminals, fax devices, videocassette recorders, microfilm and manual filing systems — through which we currently access and exchange information.

Ultimately, users will judge multimedia systems not so much by their concrete business benefits as by their qualitative impact on the workplace. Multimedia systems bring depth to traditionally flat, single-media applications, such as conferencing, messaging and data base retrieval.

In the not-too-distant future, applications that present users with a single medium, such as character-mode text, will seem as outmoded and uninvolving as a boring silent movie.

Strengthening the PBX-computer bond

By MARY JOHNSTON-TURNER

The ability to link computers and private branch exchanges has existed for some time. However, Integrated Services Digital Network-delivered information such as automatic number identification (ANI) has been the catalyst in driving market demand for switch-to-computer link (SCL) applications. For this reason, the rise of SCLs is closely related to the increasing availability of ISDN technology. Approximately 80% of some vendors' SCL applications use ISDN to provide the network-to-PBX link.

Recognizing the potential productivity gains to be realized via these services, users in the reservations, credit card service center and telemarketing arenas have avidly pursued SCL tests since late 1989. While the Commonwealth Court of Pennsylvania's May ruling barring ANI services in that state has put a significant damper on many projects ("Users rein in ANI projects after ruling," *NW,* June 11), the major

(continued on page 38)

Johnston-Turner is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting collaborative specializing in management, communications and information strategies.

Leading PBX and computer makers are establishing platforms and protocols for integrated switch-to-computer applications.

(continued from page 37)

PBX and host vendors are committed to developing a wide range of switch-to-computer products and services.

Beyond ANI, most SCL offerings support call management capabilities that will appeal to major users. Many of these products use ISDN protocols to manage channel assignments, call queuing and agent supervision, which makes them invaluable for telephone-intensive applications.

The building blocks

As shown in Figure 1 on this page, SCLs are based on a number of building blocks:

- An information feed from the public telephone network, such as ANI information or standard non-ISDN services such as dialed number information service (DNIS). Currently, ISDN Primary Rate Interface (PRI) links are the most common network interface, although some applications can accommodate non-ISDN lines.
- Call processing programs in the switch to manage network and switching information.
- Network-layer protocols, such as Q.921 and Q.931, and interfaces connecting the switch and the computer. These can be embedded in the switch and computer interfaces, or supplied by an intermediate gateway.
- An application program in the host, which processes the network information and calls up data base information associated with it.
- Links from both the computer and the switch to the desktop or other application endpoints, where voice and data transmission are brought together into an integrated application. Typically, these are relatively low-speed links (9.6K to 19.2K bit/sec).

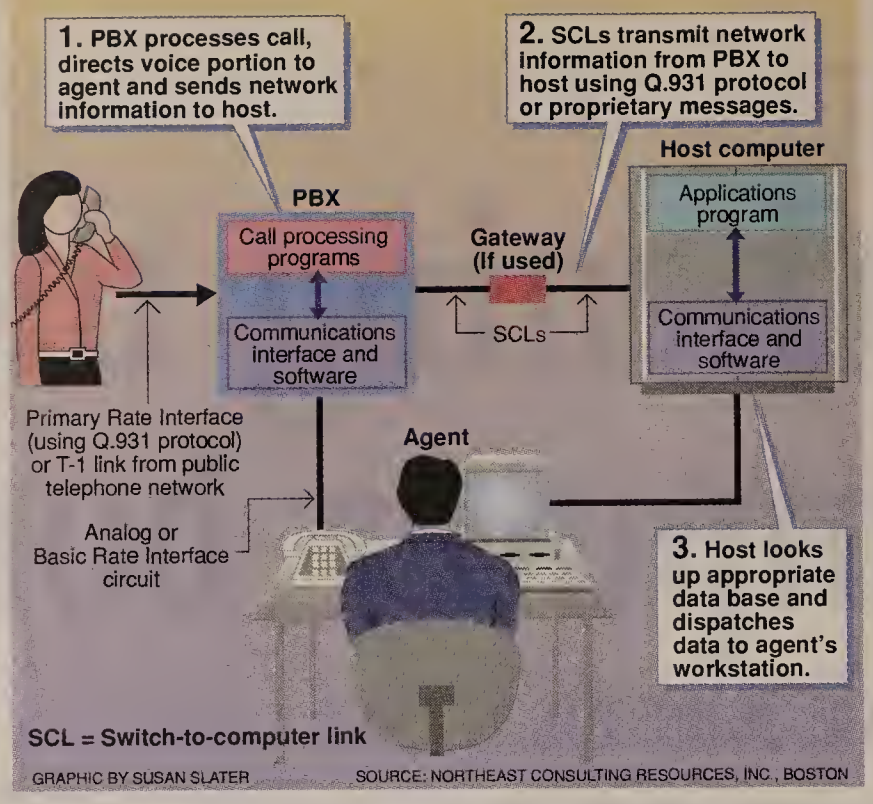
Network information — calling number IDs, dialed numbers, busy signals and so on — drives the data base lookup function on the host processor. This information provides the application program with a way to sort through a data base quickly to identify customer accounts, caller locations or other relevant information.

In a dealer locater application, the calling number ID could be used by the application program to identify the dealer closest to the calling party's location. In a DNIS application, the PBX tells the computer which incoming line was dialed by the caller. In a telemarketing center supporting multiple 800 numbers, this capability can help ensure that callers are routed to the appropriate agents.

But before the host can process the network information, the switch, which receives the network feed, must process the incoming call and strip out the pertinent information to be routed to the host. The switch can also check on the availability of agents to answer the call, placing the call in a queue or diverting it to another location if necessary.

SCLs in action

Figure 1



GRAPHIC BY SUSAN SLATER SOURCE: NORTHEAST CONSULTING RESOURCES, INC., BOSTON

The switch-to-computer interfaces and related software handle transmission of the network information from the switch to the host. Some vendors rely on a stand-alone gateway, while others place the interface and software on separate cards and application programs in the PBX and in the computer. Over time, more vendors will rely on gateways to minimize the changes required to both the PBX and the host, and to allow a single PBX to interface to multiple hosts. Direct links have been introduced to satisfy early market demand while gateways are being developed.

In either case, the switch directs the voice portion of the call to an agent or voice response unit and notifies the host. The host then processes the network information, completes the data base lookup and dispatches the data to the agent. If preprogrammed, the switch can hold the call for a period of time to allow the host to process the lookup before the call is directed to an agent.

Variations on this scenario terminate the network interface on an automatic call distributor, a voice response unit or the host itself, depending on the nature of the application. However, the application result is the same: host-based information is merged with network-based information to add more value than either could offer on its own.

Relationship to ISDN

SCL applications use ANI to drive customer service, inbound and outbound telemarketing and soon, office automation applications. However, SCLs go well beyond the call setup, forward and call status signaling supported by ISDN protocols.

According to John Spindler, product manager for Northern Telecom, Inc.'s Meridian Link, "Switch-to-computer applications are transport-independent. ISDN isn't necessary for passing commands between the switch and the host." Spindler says Northern Telecom pursued both ISDN and switch-to-host product developments simultaneously. As a result, Northern Telecom can implement SCLs using non-ISDN switch-to-computer interfaces and pre-ISDN network-provided information such as in-band ANI or DNIS.

However, illustrating how central ISDN has been to broadening the SCL market, Spindler notes that about 80% of Northern Telecom's SCL applications involve ISDN in providing network-based information. While ISDN has been critical on the PBX-to-network interface, it has not been as vital to the PBX-to-host interface, where Northern Telecom supports a variety of protocols and interface specifications.

Users evaluating the role of SCLs and ISDN for their own applications will find that ISDN is not always required. But depending on the applications and the embedded switch and host resources, using ISDN may be the best strategy for providing two key SCL elements:

- A well-defined and standardized interface and channelization scheme for terminating public network interfaces on any host, PBX, voice response unit and so forth. Today, PRI is the focal point for SCL network interfaces. In the future, ANI delivered via BRI channels will also be used for lower volume requirements — for example, a personal computer-based application used by a retail store or small company.
- Standard protocols that the public network can use to deliver information such as ANI to the customer equipment. The ISDN Q.931 protocol is the primary technique for delivering this information.

Applications and benefits

Almost uniformly, switch, host and software vendors are targeting SCL applications using vertical markets. Early application developments have been targeted toward the inbound and outbound telemarketing sector.

Paybacks of less than 12 months on the total investment in application development, purchase of SCL equipment and implementation are very common for telemarketers and teleservice agencies deploying ANI paired with SCLs. Among AT&T's ISDN users group members, which include American Express Co., First Data Resources, Inc., MasterCard International, Inc. and Union Pacific Corp., the average SCL application increased agent productivity by 17% to 20%.

Depending on the application, this increase translates into productivity savings of 5 to 15 seconds per call. For a large telemarketing center handling 40,000 calls a day, this translates into 50 to 150 or more man-hours saved or redeployed daily. At $10 per hour, this amounts to $500 to $1,500 in daily productivity savings, which could pay back a $200,000 investment in four to 12 months, depending on the specific application's calling characteristics.

Other recent development efforts have targeted:

- **Help desks.** Central troubleshooters are given instant access to relevant configuration and service data associated with problems at local and remote locations.
- **Customer service.** Customer account and claims information is linked to telephone numbers in order to reduce call hold durations and speed up problem resolution.
- **Financial service.** Dialed number information (such as an 800 number) is used to route callers to account information, interest rate and other financial services quotations without the need for human intervention.

Looking to the future, almost any type of transaction-oriented application may be enhanced to take advantage of information about the network. One example under consideration involves a message center application in which users will have access to detailed information about callers when deciding whether to return a message or accept a forwarded call.

Major strategies for switch-to-computer links

Figure 2

Vendor	Product	Alliances	Role of ISDN	Availability
AT&T	E78 Plus/ISDN (based on PC/ISDN)	• Digital Communications Associates, Inc. • Independent Software Vendor Program	CPE-to-switch interface	Current
	• ISDN Gateway • Integrated ISDN Telemarketing Gateway (both based on AT&T's Adjunct/Switch Application Interface)	• Digital Multiplexed Interface Users Group • DEC • Tandem Computers, Inc. • Wang Laboratories, Inc. • IBM	Switch-to-network interface Switch-to-gateway interface	Current
Digital Equipment Corp.	• CIT Server • CIT Applications Interface	• AT&T • British Telecommunications, PLC • Mitel, Inc. • Northern Telecom • Siemens	Switch-to-network interface	Current
IBM	CallPath Services Architecture • CallPath/400 • CallPath Host	• Northen Telecom • Rolm/Siemens • AT&T (in progress)	Optional for CallPath/400; not available for CallPath Host	Current
Northern Telecom, Inc.	Meridian Link	• DEC • Hewlett-Packard Co. • IBM • Value-added reseller program	Optional in future	X.25, 3270, Link Access Procedure B currently offered; ISDN and 802.3 in development
Siemens AG	PaCT	• DEC • Gandalf Data, Inc. • HP • IBM • Unisys Corp. • European VARs	Switch-to-network interface	To be determined in U.S. in 1990-1991

Pricing for all products ranges from $10,000 to $70,000, depending on configuration.

GRAPHIC BY SUSAN SLATER SOURCE: NORTHEAST CONSULTING RESOURCES, INC., BOSTON

Vendor close-ups

Each of the leading switch and host vendors has launched a program to develop SCLs (see Figure 2, this page). For the most part,

these programs focus on PRI network links but use a wider variety of SCL protocols and interfaces. This is largely because some major long-haul carriers currently support only such services as ANI via PRI ISDN.

Major programs now in progress include:

- AT&T's Adjunct/Switch Application Interface (ASAI) and BRI PC/ISDN initiatives.
- Northern Telecom's Meridian Link.
- Digital Equipment Corp.'s Computer-Integrated Telephony (CIT).
- Rolm Co./IBM's CallPath Services Architecture.
- Siemens Information Systems, Inc.'s PBX and Computer Teaming (PaCT) program.

ASAI and PC/ISDN

AT&T's ASAI specification, which is tightly coupled with AT&T's ISDN strategy, advocates the use of a separate gateway between the switch and the host to support SCL applications. ASAI has three major components:

- An application interface, providing application platform developers with access to lower layer network capabilities. Programming interfaces specific to individual operating systems are not included in this specification and are the responsibility of the application platform developer.
- A communications interface based on existing ISDN protocols that tells programmers how to prepare application information for presentation to the lower layer ISDN protocols. It also defines and organizes application capabilities. ASAI is designed to be independent of lower layer signaling protocols, such as Q.921 and Q.931, and may accommodate additional protocols — such as Ethernet, Fiber Distributed Data Interface or other data link and network-layer protocols — in the future.
- Functional mappings between the application and communications interfaces to allow the application to read the network information and apply it to the appropriate portion of the application process.

ASAI grew out of the ISDN/Digital Multiplexed Interface (DMI) users group, a coalition of 168 vendors and users that provides input into the development of AT&T's multivendor products and services. Many of these DMI users will eventually introduce products that comply with the ASAI specification.

AT&T introduced two ASAI products last year: the ISDN Gateway, which is a one-way PBX-to-host interface, and the Integrated Telemarketing Gateway, which is a two-way interface. Both products are currently available. Their costs vary depending on configuration but are estimated to be as low as $18,000 for an entry-level one-way gateway to $60,000 or more for a fully configured two-way gateway. Both are compatible with AT&T Definity and System 85 PBXs as well as selected voice response units, including the AT&T Conversant Voice Information System.

Among outside vendors, DEC has been an early demonstrator of ASAI compatibility. Links have been announced between the AT&T ISDN Gateway and DEC's All-In-1 Customer Service software package and DECvoice response system. Additional ASAI development projects are under way with Tandem Computers, Inc. and Wang Laboratories, Inc. These products are expected during the second quarter of 1990.

AT&T has announced that it is working with IBM to develop links between ASAI and IBM's CallPath Services Architecture. No products have been announced, however.

In addition to its PRI ASAI program, AT&T has launched a major BRI initiative known as the PC/ISDN Interface. This specification details how to link various computing platforms to AT&T's BRI cards and interfaces. Applications written with this specification are also compatible with AT&T's proprietary Digital Communications Protocol, which provides two information channels (up to 64K bit/sec) and one 8K bit/sec signaling channel to the desktop. PC/ISDN applications are designed to work with Definity, System 75 and System 85 PBXs.

One of the first offerings to be demonstrated under PC/ISDN is the E78 Plus/ISDN software package jointly developed by AT&T and Digital Communications Associates, Inc. The package allows remote users or non-channel-attached local users to access IBM mainframe computers via 64K bit/sec ISDN access lines in IBM 3278/79 terminal-emulation mode.

In contrast with ASAI applications, which target higher level applications for vertical markets such as telemarketing and teleservices, the PC/ISDN program addresses connectivity via ISDN, regardless of the vertical market.

Meridian Link

Meridian Link is Northern Telecom's specification for supporting SCLs involving its Meridian 1 PBX line. Unlike AT&T's gateway approach, Meridian Link is a direct, two-way, 19.2K bit/sec RS-232 connection between the switch and the host. The initial switch-to-processor products do not support ISDN, although the Meridian 1 supports an ISDN PRI on the PBX-to-network link. Over time, an ISDN-based SCL capability will be developed to provide greater flexibility.

Northern Telecom's approach is based on its belief that SCLs add value to some applications that do not need ISDN. This strategy differs from AT&T's, in which ISDN is considered critical to the SCL connection. Northern Telecom is attempting to gain acceptance among users that want to implement SCL applications in stages — first adapting their application program and establishing a PBX-to-computer link, then adding ISDN when it can be cost-justified.

The current Meridian Link supports a range of major network-layer protocols, including X.25, IBM 3270, and Link Access Procedure (LAP) B for the SCL. Enhancements to support ISDN's Q.931 and Q.932 protocols and IEEE 802.3 are planned.

Recognizing that over time users will require greater flexibility, such as the capability to connect multiple hosts to two or three PBX ports, Northern Telecom is working on a gateway similar in function to AT&T's products. Field trials of a gateway product are expected in coming months, but no firm date has been announced.

Integration with DEC

In March 1989, Northern Telecom demonstrated an integration of Meridian Link, then called ISDN/AP, with DEC's host environment. Since then, Northern Telecom has also announced support for Hewlett-Packard Co. equipment and software, as well as IBM's CallPath Services Architecture.

DEC's CIT Server software interfaces VAX systems with compatible PBXs. It allows for the transport of request and status information on telephone calls between the switch and the computer, and acts as the intermediary between the PBX and the CIT application interface residing on the VAX. The CIT application interface is the actual software that allows the application developer to establish and control communications channels between the computer and the switch. It passes requests from and responses to the application software from the server software.

The server software resides on a VAX/VMS system and connects to the PBX via a synchronous software link. The application interface resides on the user nodes and connects to terminals and workstations using DEC's DECnet software over a LAN.

DEC has positioned CIT in close association with its ISDN development efforts. However, as in Northern Telecom's approach, ISDN is not required for the actual SCL.

IBM's CallPath

Building on an earlier product called S/370 CallPath, which integrated IBM System 370 applications with the Rolm 9750 PBX, IBM announced its CallPath Services Architecture in May. The first product, CallPath/400, does not rely on ISDN for the switch-to-computer interface but can accommodate both ISDN and non-ISDN network information.

The architecture is implemented on a host IBM computer (for CallPath/400, an Application System/400) through the IBM CallPath Application Program Interface (API). Services supported by the API include the setup of telephone calls initiated by the application, call transfer or redirect. In addition to the CallPath/400, IBM has announced its intention to develop CallPath Services Architecture capabilities for the System/370 (CICS/MVS) and Personal System/2 Extended Edition hosts.

More a management facility than a full API, the earlier S/370 CallPath product, recently renamed CallPath Host, did not use any aspect of ISDN, either in the network interface or in the SCL. Instead, CallPath software in the 9750 switch and host established a Systems Network Architecture link, allowing call event information to flow from the switch to the host via a PS/2 under NetView/PC. CallPath Host doesn't recognize ISDN messages, which cannot yet be processed by the Rolm switch, but optimizes calling based on DNIS and other in-band network information.

IBM will continue to support and enhance the inbound call

(continued on page 49)

> AT&T's ASAI specification advocates the use of a separate gateway between the switch and the host. ▲▲▲

> IBM's CallPath/400 doesn't rely on ISDN for the switch-to-computer interface but handles ISDN and non-ISDN net information. ▲▲▲

> Northern Telecom's approach is based on its belief that SCLs add value to some applications that do not need ISDN. ▲▲▲

Future SCL standards

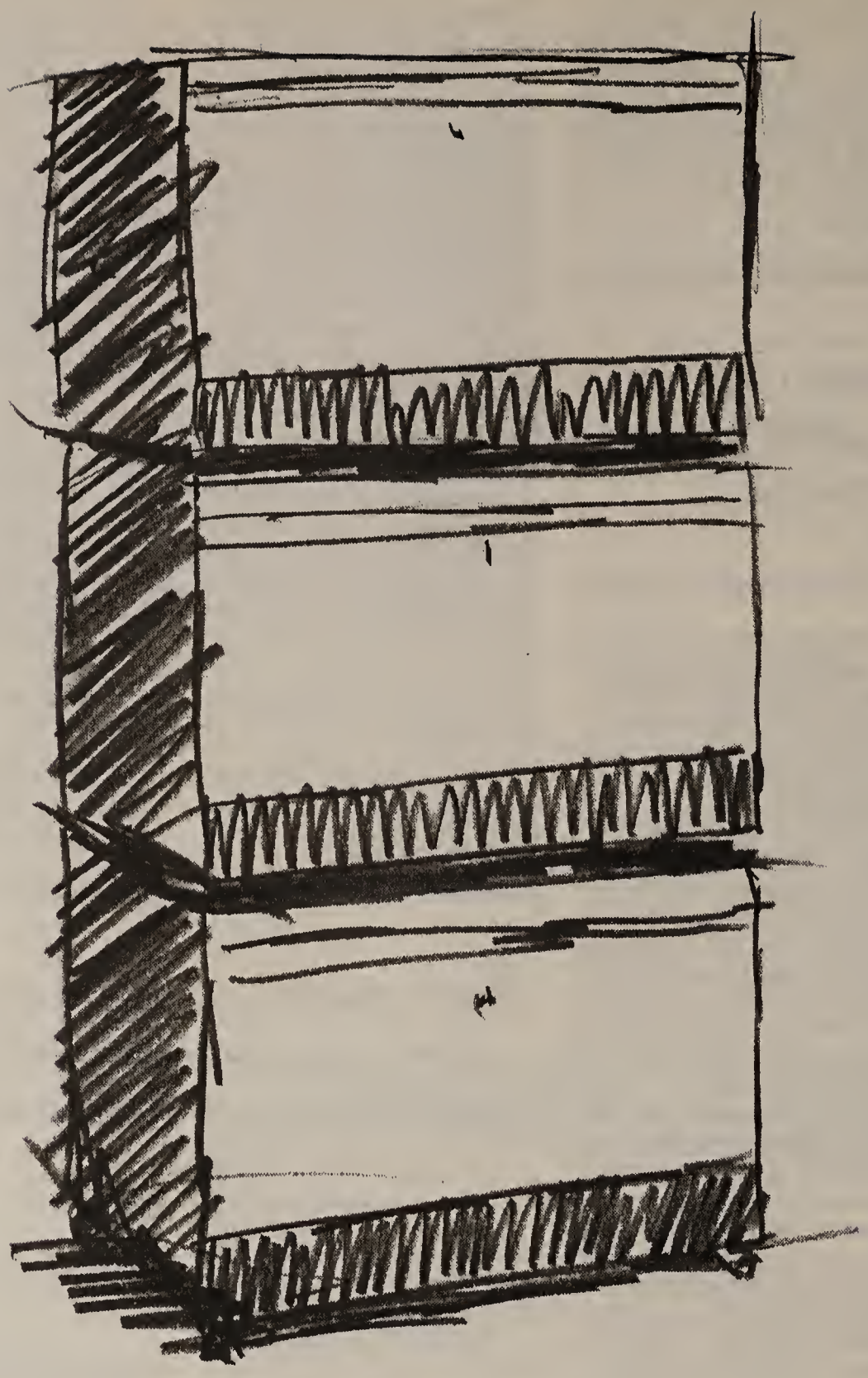
Recognizing the potential value the combination of switch-to-computer links and Integrated Services Digital Networks can deliver to end users, most major private branch exchange vendors are publishing interface and application program interface protocols.

Standards, sponsored by ANSI and the European Computer Manufacturers Association (ECMA), will ultimately provide a more level playing field.

However, for users that desire integrated switch-to-computer applications today, vendor-specific solutions are the only option. Key standards to watch include:

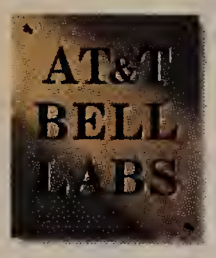
- **Computer Supported Telephony Application.** This ECMA-sponsored standard will develop an open PBX-to-computer interface. First-stage technical specifications are currently being turned into standards recommendations by the ECMA TG-11 group. This specification is likely to be endorsed by the Consultative Committee on International Telephony and Telegraphy as well as the National Institute of Standards and Technology.
- **Switched-to-Computer Application Interface.** This is a similar effort that is being sponsored by ANSI's T1S1 committee.

— Mary Johnston-Turner



Others may copy our DEFINITY system, but they can't copy what's behind it.

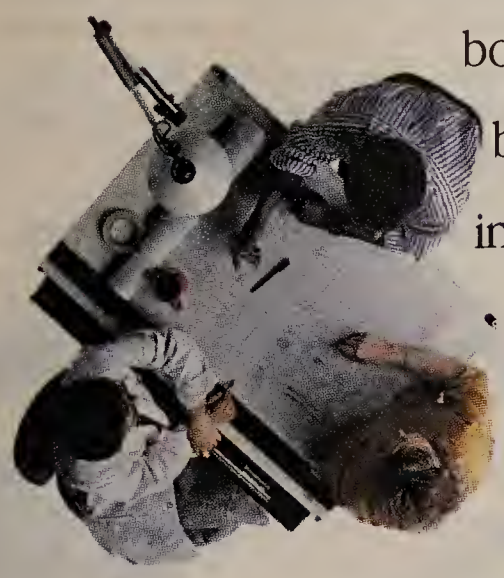
The AT&T DEFINITY® Communications System has attracted an avid following since its debut just a year ago. Customers study its ability to grow, to end obsolescence, and to protect critical telecom investments. Competitors just study it.



It all began right here.

Our secret? People.

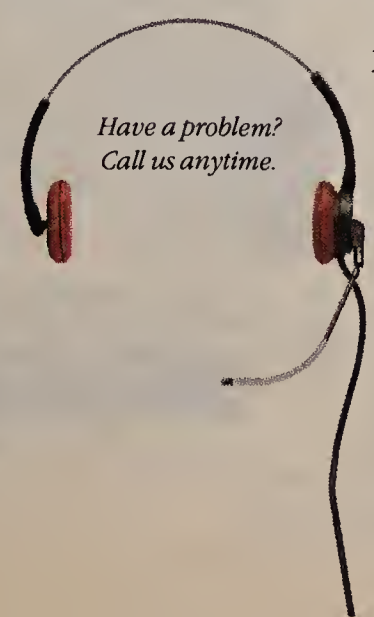
The modular DEFINITY system is an offspring of AT&T Bell Laboratories, born of the brightest, most innovative R&D minds in the entire world. Behind each system stands the largest support battalion in our industry—over 13,000 experts in Manufacturing, Product Design, Sales, Customer Service, AT&T Credit Corporation, and other specialties.



AT&T designers built critical ISDN technology into the system.

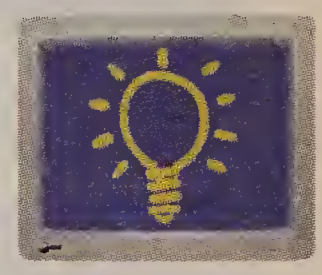
The modular DEFINITY system grows from 40 to 30,000 lines, and beyond.

We never sleep. Many of our people work through the night, every night. They can monitor the condition and performance of your DEFINITY system remotely, 24 hours a day. We also offer an around-the-clock repair line.



Have a problem? Call us anytime.

But what if... Wizards at our Remote Maintenance and Testing Service torture DEFINITY software, fixing things that you didn't even know needed fixing.



Our RMATS staff is always thinking.

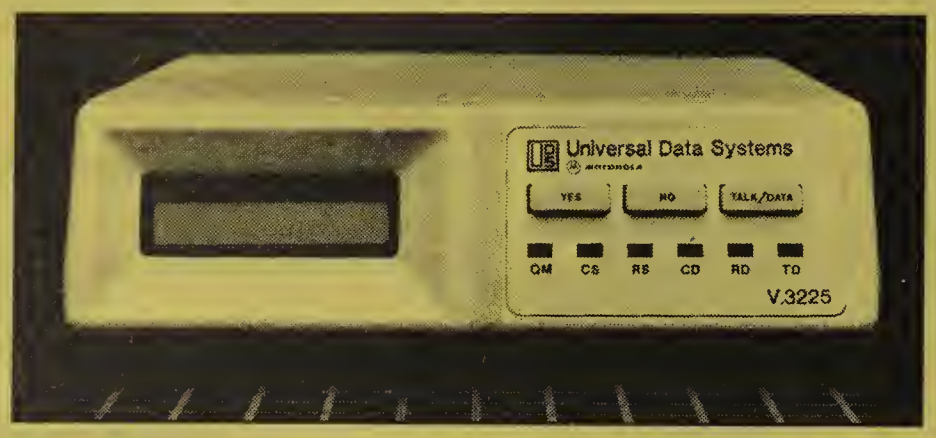
The people behind our DEFINITY system make it superior. They also guarantee that it can never be duplicated. To learn more, contact your AT&T Account Executive or call us at 1 800 247-1212, Ext. 362.

AT&T
The right choice.

MODEMS

UDS V.3225

MOTOROLA



PC MAGAZINE "If you're in the market for a full-fledged, full duplex V.32 modem, there is no reason to look any further."

INFO WORLD "The UDS V.32 Modem: High-Speed Connections at a Comfortable Price."

NW WEEK "Overall, the V.3225 is a well-designed package that can squeeze the most data into each minute of telephone time."

WHY NOT BUY THE BEST RATED V.32 MODEM FROM THE #1 RATED* UDS DISTRIBUTOR IN THE UNITED STATES -

DATA PROCESSING SCIENCES

* DPSC was named UDS Distributor of the Year 1989 for excellence in professionalism of sales force, sales volume, technical support, inventory levels, financial stability, responsiveness, etc.

Call Ruth Ann Toll Free 1-800-666-7483.

Circle Reader Service No. 1

DATACOMM MATRIX SWITCH

BLOCKED BY OLDER
MATRIX SWITCH TECHNOLOGY?

Discover the *NEW DIMENSIONS* in Network Management Technology
With the *MTRX* Family of *TANDEM* Electronic Matrix Switches

MTRX-500	512 Ports
MTRX-4000	4096 Ports
MTRX-8000	8192 Ports

BENEFITS	MTRX	OTHERS
*Largest **Non-Blocked** Port Capacity...**8192 PORTS**	YES	NO
*Up To **98%** Data Cable Reduction DTE to DCE	YES	NO
*4000 FT DTE TO DCE With Twisted Pair Cable	YES	NO
*LAN Based PC Control - Ethernet Or Token-Ring	YES	NO
*Multi-tasking (VM-386) Universal Workstation	YES	NO
*Integral BERG/BERT and S.A.M. Test Functions	YES	NO
*Non-Proprietary Database, dBASE III PLUS/IV	YES	NO
*Supports Data Rates To 2.048MBPS	YES	SOME

Over **30,000** Ports Installed At RBOCs and Fortune 1000 Companies

Datacomm Management Sciences Inc. *"The Responsive Ones"*

25 Van Zant Street
East Norwalk, CT 06855
TEL: (203) 838-7183

dBASE III PLUS/IV are trademarks of Ashton-Tate Corporation

Circle Reader Service No. 8

DATA COMMUNICATIONS TRAINING

Master the Art of Data Communication

Attend a new, intensive multi-course program that will increase your value to your organization. Course one in this Datacom Qualification Program dissects data communications technology, with emphasis on testing, through hands-on demonstrations and exercises. Course two teaches multiplexer connectivity theory using configuration exercises. Course three covers circuit concepts and test procedures for analog/digital private lines, voice switched services, baseband, DDS, T1 data networks and more. Classes are monthly beginning July 24th.

SIGN UP NOW

Call Carole Mazza at **(203) 574-1118.**

Earn 10.5 CEUs

DataComm Service Corp.
a subsidiary of General DataComm, Inc.

Circle Reader Service No. 3

CABINETS

CABINETS

Price starts from $695.00.

Immediate delivery!

All sizes and colors!

New LAN Server Cabinet Available.

CODARAM corporation

AT&T Paradyne Authorized Distributor

4040 Nine/McFarland Road, Suite 800 • Alpharetta, Georgia 30201
(404) 664-3510 • (404) 664-3610 (FAX) • (800) 726-0278

Circle Reader Service No. 2

DIAL-UP MANAGEMENT

NETWORK MANAGEMENT LESS THAN $3000, FOR THE SMALL USER

Monitor, Control and Report On:
- Dial modems
- Leased line modems
- CSU's/DSU's
- Any RS-232 device
- Voice mail
- Fax machines

- Modem vendor independent
- Powerful reporting
- Busy-out of Ring-no-answer
- Low cost, simple to install
- Automatic hot spare swapout
- Easy, low cost expansion

Optimize system utilization, reduce modem line costs, prevent client loss.

Call for a 30 day demo.

CDI
Communication Devices Inc.
1 Forstmann Ct.
Clifton, NJ 07011
800/359-8561
Fax 201/772-0747

Circle Reader Service No. 9

Send for free information

For more information on any of the products and services advertised in *Network World's* Action Center, circle the Reader Service Numbers on this card which correspond to the advertisements of interest to you.

Complete the coupon information and mail to: NETWORK WORLD
The Newsweekly of Enterprise Networking Strategies

(Aug. Expires Nov. 30, 1990)

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	
18	19	20	21	22	23	24	25	
26	27	28	29	30	31	32	33	
34	35	36	37	38	39	40	41	
42	43	44	45	46	47	48	49	
50	51	52	53	54	55	56	57	

Name_____
Title_____
Company_____
Street_____
City_____
State_____ Zip_____
Phone_____

Send for free information

For more information on any of the products and services advertised in *Network World's* Action Center, circle the Reader Service Numbers on this card which correspond to the advertisements of interest to you.

Complete the coupon information and mail to: NETWORK WORLD
The Newsweekly of Enterprise Networking Strategies

(Aug. Expires Nov. 30, 1990)

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	
18	19	20	21	22	23	24	25	
26	27	28	29	30	31	32	33	
34	35	36	37	38	39	40	41	
42	43	44	45	46	47	48	49	
50	51	52	53	54	55	56	57	

Name_____
Title_____
Company_____
Street_____
City_____
State_____ Zip_____
Phone_____

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

DIAGNOSTIC TEST EQUIPMENT

THE FASTEST PROTOCOL ANALYZERS FOR NETWORK TESTING AND ANALYSIS

INTERVIEW® 6800, 7200, 7700 TURBO Series

Are Now The Easiest To Use, with AR's New EASY-VIEW™ Menu System

- Test networks at speeds over 400 Kbps
- 44MB hard disk standard
- Record to disk at speeds up to 384 Kbps
- Built-in library of application programs to test ISDN, T1, G.703, SNA, X.25, . . .

AR DIVISION OF TELENEX

Telenex Corporation
AR Division
7401 Boston Blvd.
Springfield, VA 22153
FAX: (703) 644-9011

Call today for more information:
1-800-368-3261
(in VA 703-644-9190)

AR . . . We Make Networks Work

Circle Reader Service No. 5

LAN AND WAN CONNECTIVITY

THE MOST COMPLETE T–1 ACCESS SOLUTION FOR AT WORKSTATIONS

ON BOARD CSU/DSU LETS YOUR WORKSTATION PLUG DIRECTLY INTO FRACTIONAL AND FULL T–1, PRI ISDN AND E1 (CEPT) SERVICES.

- SINGLE SLOT 16 BIT AT BUS
- HIGH PERFORMANCE IAPB PROTOCOL
- SELECTABLE X.25 PROTOCOL
- 12 Mhz COPROCESSOR WITH SHARED MEMORY
- MULTIPLEXING BUS FOR VOICE AND HIGH SPEED DATA
- FILE TRANSFER SOFTWARE INCLUDED
- SOFTWARE DEVELOPMENT SUPPORT FOR: Network Gateways, Bridges and Routers File Servers and Image Processors
- AUTO DIALING/ANSWER SOFTWARE FOR ISDN

PROMPTUS

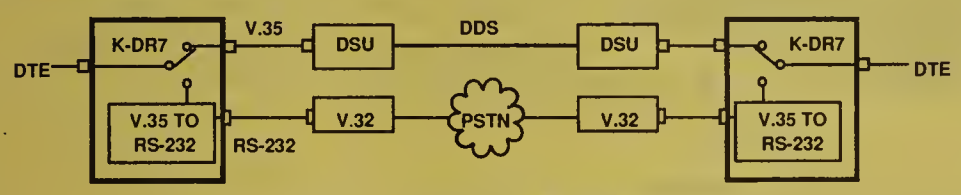
A Workgroup Connectivity Company
207 High Point Ave., Portsmouth, RI 02871
Tel (401) 683•6100; Fax (401) 683•6105
1•800•777•LANS

Circle Reader Service No. 10

DISASTER RECOVERY

AUTOMATIC BACK-UP OF DIGITAL CIRCUITS

Dataprobe's Automatic A/B Switches allow digital circuits to be backed up by switched analog or digital services.



56 KBPS CIRCUIT WITH V.32 MODEM BACK-UP

K-AB-232	Industry's Most Versitile Automatic RS-232 A/B Switch.
K-AB-V35	V.35 Version for High Speed Circuits.
K-DR7	Back-up 56KBS DDS with V.32 Modems.
K-56	Security Back-up with Switched 56 Services.
SMART-LINE	Dial-In Remote Control for any A/B Switch.

dataprobe INC.

170 COOLIDGE AVENUE
ENGLEWOOD, NEW JERSEY 07631
(201) 569-6464 FAX (201) 894-0939

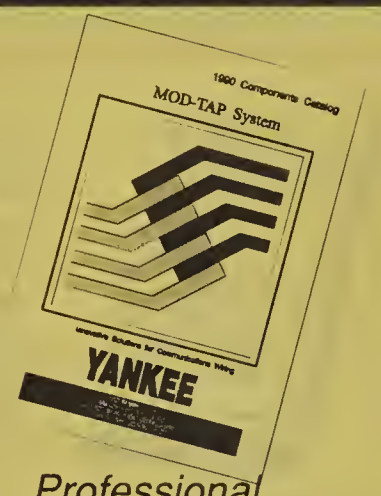
Circle Reader Service No. 4

NETWORK COMPONENTS

Brand New!! Network Components Catalog

and it's FREE from Yankee! Call now for your brand new 64-page MOD-TAP System Components Catalog featuring:

- Baluns/Active Hub
- Distribution Frames
- Patch Panels
- Test Gear
- Adapters
- Wall Plates



YANKEE

TOLL-FREE 1-800-365-9720

Professional Products and Solutions to Networking

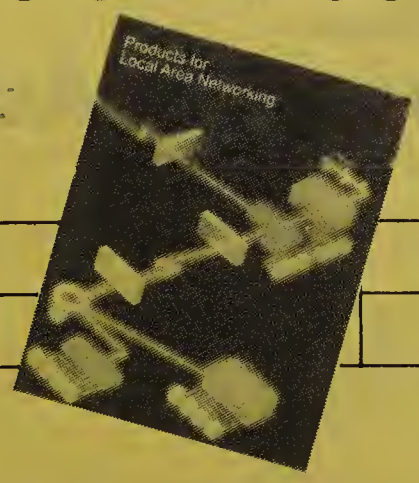
Circle Reader Service No. 11

FREE CATALOG

* NEW * LAN PRODUCTS CATALOG

FREE FROM:

THE RAD GROUP



East:
151 W. Passaic St.
Rochelle Park, NJ 07662
TEL: (201) 587-8822
FAX: (201) 587-8847

West:
7711 Center Avenue
Huntington Beach, CA 92647
TEL: (714) 891-1964
TEL: (714) 891-7788

Circle Reader Service No. 25

Send For Free Info

NW Aug 90

For more information on any of the products and services advertised in *NetworkWorld's ActionCenter,* circle the Reader Service Numbers on this coupon which correspond to the advertisement of interest to you.

Complete the coupon information and mail to:
NetworkWorld
P.O. Box 5090, Pittsfield, MA 01203

Expires 11/30/90

Name _____
Title _____
Company _____
Phone ( ) _____
Street _____
City _____
State _____ Zip _____

NW Aug 90

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	
18	19	20	21	22	23	24	25	
26	27	28	29	30	31	32	33	
34	35	36	37	38	39	40	41	
42	43	44	45	46	47	48	49	
50	51	52	53	54	55	56	57	

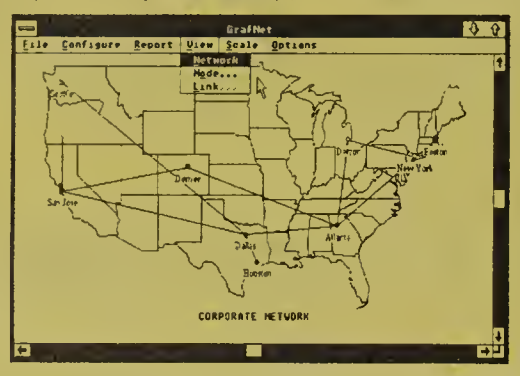
NETWORK PLANNING

GrafNet provides instant visual displays of network topologies...

PC Software allows easy viewing of network configurations.

FEATURES:

* Built-in database automatically converts Area code/Prefix to an on screen geographical location.
* Add and delete lines and nodes through our friendly Microsoft Windows interface.
* View topology nation-wide or on a state by state basis.
* Zoom in on a geographical area for closer viewing.
* Print and plot to any device supported by Microsoft Windows.



$450
FREE DEMO DISK

Call today for more information: (408) 446-9598
Network Dimensions, Inc. 5339 Prospect Road, Suite 122, San Jose, CA 95129

Circle Reader Service No. 6

SOFTWARE

MANAGE YOUR NON-SNA PHYSICAL NETWORK FROM NetView™

Network management Access Program™

OFF THE SHELF **TURNKEY** **GATEWAY** to **NetView**

- Two-way Command Response flow for almost any Device or Element Manager.
- If NAP Device Alarm Support Files already exist, just plug in the Device. Otherwise, send us the Alarm Message Formats and we will generate the support at no charge.
- On-site System Integration and Training optionBook ally available.
- Utilizes IBM's® NetView/PC™ Service Point API for NetView Connection.
- Up to 33 different Devices/Element Managers connected via a single NAP Gateway.
- Filtering, Thresholding, Logging, AutomationExits, Command Language (embed in "C", etc.), NetCenter support, Alert Queueing with automatic recovery, and more.
- OS/2® Presentation Manager™ Customization Program allows swift, easy maintenance.
- Customization Program – $4,500.00; Runtime Program – $1,500.00 (per machine)

Automated Network Management, Inc.
formerly Carl Vanderbeek & Associates
27134-B Paseo Espada, Suite 222
San Juan Capistrano, CA 92675
Phone: 714-493-2925 / Fax: 714-493-2655
or call your IBM Sales Representative

IBM Business Partner

Circle Reader Service No. 12

NETWORK SCANNING AND MONITORING

Cable Scanner

Pinpoint Network Cable Faults Fast!

The Scanner is a monitor, fault finder, cable locator and much more. Helps you pinpoint the location of shorts, opens or breaks. Its 32 character display reports the fault in plain English "short at 306 ft". With an oscilloscope, Scanner's high speed, pulse generating circuitry gives a detailed view of the entire LAN including transceiver, terminator and multiple faults.

* Cable length measurements
* Locate breaks, shorts, opens, bad crimps, etc.
* LAN activity monitoring
* Find cables in ceilings, walls, floors
* Cable TV troubleshooting
* Generate as-built drawings and specifications
* Isolate faulty network interface cards
* Very simple to operate

Included is Tracer for locating exactly where in the floor, ceiling, wall or patch panel the cable lies. Cable Scanner, Tracer and Operators' Manual are only $1495.

M-Test Equipment
P.O. Box 460008
San Francisco, CA 94146-0008

Call for info

Outside CA: (800) 334-4293
Inside CA: (415) 861-2382
FAX: (415) 864-1076

Circle Reader Service No. 7

TELECOM SYNC MONITOR

NEW Telecom Sync Monitor

The Model 3860 continuously monitors up to 14 DS1 inputs, and its modular architecture easily permits system expansion for up to 98 input DS1s. An external reference such as GPS, Rb or Cs can be utilized to locate potential SLIPS in synchronization allowing the sync operator to evaluate the source of the problem ***before*** Frame Slips occur.

- ♦ Eliminates loss of time, data and customers
- ♦ Complete alarm reporting of DS1 inputs
- ♦ Stores significant data for 30 days
- ♦ PC controllable
- ♦ Time-tag events
- ♦ Local or remote operation
- ♦ Graphic frequency and phase plots
- ♦ Tolerates jitter of 30 UI @ 10 Hz
- ♦ External reference (GPS, Cs, Rb)
- ♦ Frequency measurement range of ± 15 PPM

FTS / AUSTRON

WESTERN OFFICE
AUSTRON, INC
P.O. Box 14766
Austin, TX 78761-4766
(512) 251-2313

CENTRAL OFFICE
AUSTRON, Inc.
1930 Isaac Newton Sq.
Suite 111
Reston, VA 22090
(703) 471–7963

EASTERN OFFICE
FREQUENCY AND TIME SYSTEMS, INC.
34 Tozer Road
Beverly, MA 01915-5510
(508) 927–8220

Circle Reader Service No. 13

Profits come from sales... Sales come from leads... Leads come from an ad in ActionCenter!!

Network World is the only publication that gives you weekly exposure for a month, directory-type pages, and bingo card response -- all for one cost-effective price!

Call today and generate leads and profits from your 300,000 impressions in *Network World's* **Action Center.**

Joan Bayon Pinsky
508-875-6400

Clare O'Brien (Pacific & Mountain Time)
800-622-1108

NETWORKING MARKETPLACE

NETWORK WORLD
The Newsweekly of User-Networking Strategies

WE HAVE THE RIGHT ANSWER

Advertisers who want to place their print ads in a quality publication ask the question: "Is your circulation audited?"

We're very proud to answer "Yes."

We are a member of the Audit Bureau of Circulations because we share ABC's belief that circulation audits are an essential assurance of value.

ABC is the premier circulation auditing organization in the world, and has been since 1914. Each year, ABC auditors test and verify that our circulation figures are facts, not claims. An ABC audit is the sign of a sound investment for advertisers.

Not all publications are audited, but they should be. Because when advertisers ask "Is your circulation audited?" there's only one answer.

"Yes."

Audit Bureau of Circulations

UNIQUE EDITORIAL

Every week, ***Network World*** provides information that helps users who design, purchase and implement enterprise networks.

Network World's
Weekly Coverage

* News
* Industry Updates
* Telecommunications
* Data Communications
* Local Networking
* Management Strategies
* Products and Services
* Buyer's Guides/Features
* International Networks

Enterprise networking is the driving force in today's end user market and the driving force of ***Network World's*** editorial.

TELE-COMMUNICATIONS TCA ASSOCIATION

1990 TCA ANNUAL CONFERENCE

September 25–27
San Diego Convention Center
333 W. Harbor Drive, San Diego

Come and see the latest in telecommunications technology at the 28th Annual TCA Conference. Over 350 companies will showcase the most recent developments in . . .

- *telephone systems*
- *data equipment*
- *modems, multiplexers*
- *facsimile equipment*
- *network services*
- *switching equipment*
- *ISDN*
- *voice processing*
- *security*

. . . and much, much more!

Exhibits passes are $20 at the door.

EXHIBIT HOURS

Tuesday, Sept. 25	1:00–6:00 p.m.
Wednesday, Sept. 26	9:00 a.m.– 6:00 p.m.
Thursday, Sept. 27	9:00 a.m.– 5:00 p.m.

For more information, contact the Tele-Communications Association at 818-967-9411

See The FAXNeT Form on Page #17

The following advertisers appear on the FAXNeT form on page #17:

T.C.A.

Tel. Training Monthly

Teletutor

READERSHIP LEADER

Unlike vertical technology publications, ***Network World*** has the only editorial format that covers all the technologies pertaining to the enterprise network.

That's why ***Network World*** is winning many of the industry's most prestigious and independent readership studies:

1989 Communication Networks	#1
1989 ADCU Member	#1
1988 Wall Street Journal ICA Member	#1
1988 TCA Member	#1
1988 TFS Network Management	#1
1988 TFS MUX Market	#1
1988 TFS Modem & DSU	#1

BUSINESS OPPORTUNITY

Manufacturers' Representatives

Immediate Openings Throughout the United States

Recently acquired by Bytex Corporation, VANCE Systems, a leading manufacturer and developer of local area network test and analysis systems, is seeking manufacturers' representatives to represent its line of ATS 1000 4/16 Mbit Token Ring, Ethernet, and Token Bus LAN and Analysis systems, directly to end user organizations.

We require our representatives to have three or more years of direct sales experience with LAN products. Experience with protocol analyzers (Network General, Spider Systems, Excelan, etc.) is a plus, but not required. Firm must have established relationships with all Fortune 500 accounts in its territory, and must not represent any competitive lines.

A number of territories are now open. For immediate consideration and more information, FAX or mail complete information on your firm as soon as possible to: Robert Welch, Director, LAN Sales, Bytex Corporation, Southborough Office Park, 120 Turnpike Road, Southborough, MA 01772-1886. Telephone: (508) 480-0840 x 285, FAX: (508) 460-0098.

Bytex®
No-Nonsense Know-How

TRAINING

TELETUTOR®

COMPUTER-BASED TRAINING

LAN
X.25
T1

FOR FREE CATALOG OF ALL OUR COURSES
CALL
1-800-542-2242
(603) 433-2242

TeleCommunications Training Monthly

VIDEO TAPE
Training & Industry News

New subject every month including:

- X.25 Protocol Analysis
- SDLC/SNA Protocol Analysis
- ISDN BRI "The Basics"
- Switched Telephone Circuit Basics
- T1-Carrier
- Network Topology
- Local Area Network Protocols
- DataCom Concepts (RS-232-C)
- Analog Line Measurements

Call for Demo Tape
(215) 598-3293

SERVICES

Network Planning And Design offers their vast experience in private network management, consulting, contract engineering and implementation.

For assistance call (305) 720-5146

VOLUME BUYERS

Network World subscribers are enterprise network buyers who buy your products and services in volume for use throughout the entire enterprise.

SCOPE OF PURCHASE RESPONSIBILITY

Enterprise-Wide	76%
Departmental	21%

Source: December, 1989 ABC

They have purchase responsibility for an average of 17 sites and plan to spend an average of $3.5 million on networking equipment and services in 1990.

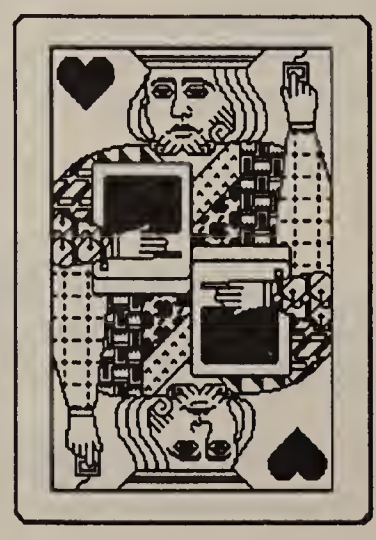
COMING TOGETHER... LEARNING TOGETHER

CMA TELCOM 90

THE NEW YORK HILTON
Oct. 21-24, 1990

CMA TELCOM 90

Call: 1·800·CMA·EXPO
For Complete Conference Information



***Network World*'s Direct Response Card Decks** can be your trump card for generating quality leads and boosting your sales. When you advertise in our decks, your message reaches audited buyers, for just pennies a contact. And with your advertising message on one side and your company name and address on the other, we make it easy for our readers - your customers - to respond to your message.
For information on issue dates, closings and rates, call:

Joan Bayon Pinsky
Sales Director/
Product Classified Advertising
1-800-622-1108
(or in MA 508-875-6400)

Clare O'Brien
Account Executive
1-800-622-1108
(or in MA 508-875-6400)
(Mountain and Pacific time zone advertisers)

Your marketing success is in the cards — *Network World*'s Direct Response Cards.

NETWORK WORLD RESOURCE DIRECTORY

Network World's Resource Directory is a new service for both our advertisers and our readers. The Resource Directory is updated monthly to be the most comprehensive listing of networking products and services available anywhere. With over two hundred categories to choose from, you can place your company under the most appropriate headings to make it easily accessible for our 75,000 audited buyers.

All rates for listings are sold on a 26-week basis and are net priced for that period. For less than $20. a week, your listing will appear in Network World's Resource Directory every week for a 26-week period, making this opportunity very affordable. A line listing is company name and telephone number.

Display listings are also available in three sizes. A display listing consists of copy of your choice.

Line Listing Rates (prices are net for 26-week period)

Company listing	$500.
2-9 additional listings	$450. per listing
10 or more additional listings	$400. per listing
Bold listing — extra	$ 50. per listing

Display Listing Rates (prices are net for 26-week period)

2 5/16″ wide x 1″ deep	$2,000.
2 5/16″ wide x 1 1/2″ deep	$2,800.
2 5/16″ wide x 2″ deep	$3,600.

Space and copy closing for next updated issue is July 30. Listing begins in August 13 issue and runs through the February 11, 1991 issue.

For more information or the list of headings, call Eleni Brisbois, Resource Directory/Project Manager at 1-800-622-1108 or 508-875-6400.

To place your listing call 1-800-622-1108 or fax 508-879-3167 or mail your order to *Network World*, Eleni Brisbois/Resource Directory, 161 Worcester Road, Framingham, MA 01701-9172.

Computers/Peripherals

Channel Extenders
AT&T Paradyne 800-482-3333

Facsimile Machines
GammaLink 408-744-1430

Data Communications

Data Compression Equipment
RAD Data Communications Inc .. 201-587-8822

Diagnostic Test Equipment
Analog Line Testers
Navtel Inc 416-479-8090
3M Dynatel Systems Division ... 800-426-8688

Cable/Interface Testers
Navtel Inc 416-479-8090

Centralized Network Management Systems
AR Division, Telenex Corp. 800-368-3261
Communication Devices, Inc 800-359-8561
DIGILOG/CXR 215-628-4530

Error-Rate Measurement Equipment
Navtel Inc 416-479-8090
3M Dynatel Systems Division ... 800-426-8688

Optical Fiber Test Equipment
3M Photodyne Inc 805-388-8378

Performance-Measurement Equipment
Navtel Inc 416-479-8090
3M Dynatel Systems Division ... 800-426-8688
Tektronix/LP Com 800-826-8675

Protocol Analyzers

Protocol Analyzers cont.
DIGILOG/CXR 215-628-4530
Hewlett-Packard Company
Colorado Telecomm Div 719-531-4414
Navtel Inc 416-479-8090

Tektronix/LP Com 800-826-8675

Protocol/Interface Simulators
Navtel Inc 416-479-8090

DSU/CSU
Anixter 800-343-5142
AT&T Paradyne 800-482-3333
RAD Data Communications Inc. . 201-587-8822

Front-End Processors
Simpact Associates, Inc 619-565-1865

Microwave
Motorola Microwave 800-962-1826
Racon, Inc 800-426-5245

Modems
Limited Distance/Line Drivers
RAD Data Communications Inc. . 201-587-8822

Low Speed (up to 4.8kbps)
AT&T Paradyne 800-482-3333

Medium Speed (4.8 to 9.6kbps)
AT&T Paradyne 800-482-3333

High Speed (9.6kbps+)
Anixter 800-343-5142
AT&T Paradyne 800-482-3333

Fiber Optic
Canoga-Perkins Corp. 818-718-6300
RAD Data Communications Inc. . 201-587-8822

Multiplexers
Optical Fiber
Anixter 800-343-5142
Canoga-Perkins Corp. 818-718-6300
RAD Data Communications Inc .. 201-587-8822

Statistical
RAD Data Communications Inc .. 201-587-8822

Time Division
RAD Data Communications Inc .. 201-587-8822

T-1
Anixter 800-343-5142
AT&T Paradyne 800-482-3333
Canoga-Perkins Corp. 818-718-6300
RAD Data Communications Inc. . 201-587-8822

Network Management Systems
AR Division, Telenex Corp. 800-368-3261
AT&T Paradyne 800-482-3333
Communication Devices, Inc. ... 800-359-8561
Dynatech Communications 703-550-0011
Micro Technology 714-970-0300

Patching Equipment
AR Division, Telenex Corp. 800-368-3261
3M Private Network Products ... 512-984-3371
Thomas & Betts Corporation 908-685-1600

Systems Integrators

Switches
Matrix
Dynatech Communications 703-550-0011

Packet
Amnet, Inc. 508-879-6306

Port Selectors
RAD Data Communications Inc .. 201-587-8822

Terminal Emulation Boards
Avatar Corporation 800-282-3270

Terminal Servers
Datability Software Systems 800-DIALDSS

Local Area Networks

Bridges
Anixter 800-343-5142
CrossComm 508-481-4060

Bridges cont.
EICON TECHNOLOGY CORP. ... 514-631-2592
RAD Data Communications Inc .. 201-587-8822

Brouters
RAD Data Communications Inc .. 201-587-8822

Gateways
EICON TECHNOLOGY CORP. ... 514-631-2592
Simpact Associates, Inc. 619-565-1865

Installation Services
Solunet Inc 800-828-0151

Local Area Networks
Broadband Based
Anixter 800-343-5142

Ethernet Compatible
Anixter 800-343-5142

DuPont-Electro-Optic Products 800-888-LAN1
Wise Components, Inc. 800-543-4333

Fiber Optic Based
Anixter 800-343-5142

10BaseT Systems
DuPont-Electro-Optic Products 800-888-LAN1

Token Ring
Anixter 800-343-5142

Token Ring Compatible
DuPont-Electro-Optic Products 800-888-LAN1

LAN Services

LAN/Mind, Inc. 800-325-5267

LAN Test/Management Devices
DIGILOG/CXR 215-628-4530
Hewlett-Packard Company
Colorado Telecomm Div 719-531-4414
Tektronix/LP Com 800-826-8675

Routers
Anixter 800-343-5142

Security

Encryption/Decryption Devices
GN Telematic, Inc. 508-667-8644

Software

Application Development Tool Kit
Proteo Software Inc 800-668-6716

NETWORK WORLD RESOURCE DIRECTORY

Communications
Simpact Associates, Inc. 619-565-1865

EMail/Messaging
Notework Corporation 617-734-4317

Facilities Management
CHI/COR Info. Management 312-454-9670
DIGILOG/CXR 215-628-4530
XTEND COMMUNICATIONS 212-725-2000

Micro-to-Mainframe
EICON TECHNOLOGY CORP. ... 514-631-2592

Network Management
Communication Devices, Inc..... 800-359-8561
CrossComm 508-481-4060
DIGILOG/CXR 215-628-4530

Storage Devices & Media

Computer Room Equipment
Controller Stacking Frames
Data Connections, Inc..... 919-668-1077

Structured Wiring Systems

Baluns
Anixter..... 800-343-5142
RAD Data Communications Inc .. 201-587-8822
The Siemon Company 203-274-2523
Thomas & Betts Corporation 908-685-1600
Wise Components, Inc..... 800-543-4333

Cables
Coax
Anixter..... 800-343-5142
Wise Components, Inc..... 800-543-4333
Fiber Optic
Anixter..... 800-343-5142

3M Private Network Products ... 512-984-3371
Wise Components, Inc..... 800-543-4333
Twisted Pair
Anixter..... 800-343-5142
Wise Components, Inc..... 800-543-4333

Connectors
Anixter..... 800-343-5142
3M Private Network Products ... 512-984-3371
Thomas & Betts Corporation 908-685-1600
Wise Components, Inc..... 800-543-4333

Cross Connect Blocks
Anixter..... 800-343-5142
3M Private Network Products ... 512-984-3371
The Siemon Company 203-274-2523

Wiring Concentrators
Anixter..... 800-343-5142

Support Equipment

Power Distribution/ Equipment Protection
Secondary
The Siemon Company 203-274-2523
UPS
3M Private Network Products ... 512-984-3371

Network World's
Resource Directory is your source for selling networking products and services.

With over 200 category headings available, your company's products are easily accessible at a glance.

Published weekly and updated monthly, it's the most comprehensive networking directory anywhere.

Call Eleni Brisbois at 1-800-622-1108 today to place your listing.

Support Services

Consulting
LAN/Mind, Inc. 800-325-5267
XTEND COMMUNICATIONS 212-725-2000

Educational Training Services
Data Communications
Business Communications Rev. 708-986-1432
ICA 800-422-4636
LAN
Business Communications Rev. 708-986-1432
ICA 800-422-4636
Westcon Training Centers..... 212-465-9000
Novell
LAN/Mind, Inc. 800-325-5267
PTXI..... 800-783-PTXI
Westcon Training Centers..... 212-465-9000
E-Mail Training
Westcon Training Centers..... 212-465-9000
Telecommunications
Business Communications Rev. 708-986-1432
ICA 800-422-4636
3COM
PTXI..... 800-783-PTXI

Installation Services

Solunet, Inc. 800-828-0151

Lease/Resale Organization
SOURCE Telecommunications .. 214-450-2600

Telecommunications/ Voice

Call Accounting
DIGILOG/CXR 215-628-4530
XTEND COMMUNICATIONS..... 212-725-2000

Key Systems
SOURCE Telecommunications 214-450-2600

Fax Processing Systems
The FAX Group 619-792-6400
GammaLink..... 408-744-1430

ISDN Products
Anixter..... 800-343-5142
Hewlett-Packard Company
Colorado Telecomm Div..... 719-531-4414

PBXs (under 200 lines)
SOURCE Telecommunications 214-450-2600

Microwave Transmitters/Receivers
Motorola Microwave..... 800-962-1826
Racon, Inc..... 800-426-5245

Voice Response
Syntellect Inc. 602-789-2800

VSAT Customer Premises Equipment
Scientific-Atlanta, Inc.
Private Networks Business 407-255-3000

For whatever you sell from A to Z, you should place it under a heading in *Network World's* Resource Directory.

Transmission Services

Cellular Radio

Dedicated Lease Line
Communications Transmission. 512-328-1112

Facsimile
GammaLink..... 408-744-1430

Microwave
Motorola Microwave..... 800-962-1826
Racon, Inc..... 800-426-5245

Packet Switching
Dynatech Communications 703-550-0011

VSAT
GTE Spacenet Corporation 703-848-1000
Scientific-Atlanta, Inc.
Private Networks Business 407-255-3000

Wide Area Networks

Concentrators
Amnet, Inc. 508-879-6306
Network Switches
Amnet, Inc. 508-879-6306

Network World Third Quarter 1990 Editorial Features

July 23
Network World/LanQuest LAN Test Series: Network Interface Card I/O Options

July 30
Trends Reshaping Networks: Corporate Mergers

August 6
Trends Reshaping Networks: Multimedia Integration

August 13
Telecom Services Buyer's Guide: BOC Calling and Travel Card Services

August 20
Network World/LanQuest LAN Test Series: Remote LAN Access Software

August 27
Telecom Buyer's Guide: Voice Messaging Systems
Bonus: Harvey Study Issue

September 3
Trends Reshaping Networks: Evolving Standards

September 10
Network World/LanQuest LAN Test Series: LAN Analyzer Performance Issues
Bonus Distribution: NetWorld Dallas

September 17
Telecom Services Buyer's Guide: Comparison of Carrier Customer Service Organizations

September 24
Network World 5th Annual Budget Survey *Bonus Distribution: TCA*

Strengthening the bond

continued from page 39

processing capabilities of CallPath Host for users that do not require two-way communications between the switch and the host. The AS/400 Telephony Applications Services software, which links the AS/400 with Rolm and Siemens switches, will also continue to be supported. However, CallPath/400 will become IBM's flagship product for providing SCL applications in the AS/400 environment. In addition to Rolm and Siemens, Northern Telecom — and, eventually, AT&T — will also support the CallPath Services Architecture.

Siemens' PaCT

Although it has not yet announced a specific U.S. initiative beyond compatibility with the CallPath Services Architecture, Siemens is very active on the international SCL front and, within the next year, is likely to make announcements that will affect the U.S. market. Under its PaCT program, Siemens has demonstrated SCLs — using its Application Connectivity Link protocol — between its European flagship switch, the Hicom, and DEC, HP, IBM and Unisys Corp. hosts. An additional agreement for links with Gandalf Data, Inc.'s Starmaster computer communications system was announced in March.

> The costs of software development and adaption will dwarf the rest of the investment.
>
> ▲▲▲

Choosing an application

Before selecting an SCL application, users need to review the functional specifications of the application with both their switch and host vendors.

Some of the costs users should be aware of include:

- Switch interface and software upgrade.
- Onetime network service provisioning.
- Ongoing cost of ANI or other network information delivery.
- Retraining of agents.
- Host interface upgrade.
- Software development and adaption.

In general, the costs associated with software development and adaption will dwarf the rest of the application investment, often comprising 70% to 80% of the total project cost.

The cost of implementing these types of applications will vary widely from a low end of $40,000 to $50,000 for a single application and a limited number of agents, to hundreds of thousands of dollars for major software developments, new switch installations and scores of agents. Gateway-based solutions cost more than direct interfaces but allow multiple hosts and applications to be interfaced to a limited number of switch ports.

Because standards have not yet been fully developed and are not expected to be available in commercial products for 12 to 18 months, each SCL is essentially a bilateral agreement between a specific switch and a specific host, voice response unit or software vendor. Users must take the time to spell out which parties have responsibility for which aspects of the application integration. Conducting pilot programs to assess where the real benefits and productivity savings can be derived are recommended as well.

Future issues users and vendors will face include how much control should be allocated to the host vs. the switch, and to what degree ISDN should be used as a centerpiece switch-to-computer interface vs. an enabling network connection technology.

In general, users will find that their greatest application investment is in the host processor, the application software and the data base. As SCL applications mature and expand beyond the telemarketing and customer service environment, the SCL capabilities and strategic alliances will be increasingly important in the selection of new switches, which will have to support integrated switch-to-computer applications.

Con

continued from page 27

taining 8K to 16K bit/sec digitized voice of acceptable quality. However, the hardware costs have been high, preventing mass market acceptance.

Now, because of major advances in digital signal processor (DSP) technology, digitized voice at 8K to 16K bit/sec has become economically attractive.

When voice is digitized and compressed down to these low data rates, however, the circuit cannot ordinarily carry fax. An audio fax signal is different from a human voice signal. Therefore, voice compressors generally don't work well with fax signals.

However, the same DSP that does the voice digitizing can be programmed to automatically detect when the voice signal is really a fax whistle.

It then converts from voice digitizing to fax demodulation, becoming a fax modem that redigitizes the fax for transportation over the WAN, using only 9.6K bit/sec.

By combining low bit rate voice digitizing and fax demodulation, the 70% consumption factor for voice or fax can be reduced to just 10% of a T-1 channel, or 154K bit/sec, which is a major reduction.

The other bandwidth consumers — data (LAN or computer) and video — can also be significantly reduced. Data compression has achieved the status of an industry standard (V.42bis), and data compression chips are now available. Data compression techniques usually yield reductions of 50% to 75%. In a similar way, the same DSP technology used in voice compression can be used to compress video signals down to between 64K and 128K bit/sec for videoconferencing applications. So the 30% consumption factor for data and video can be reduced to just 10% to 15%, giving a combined voice/fax/data/video reduction effect of just 20% to 25% of the original bandwidth.

Even after all this reduction, it is still possible to save bandwidth by changing the multiplexing technique from time-division multiplexing (TDM) to fast packet multiplexing (FPM). FPM dynamically allocates bandwidth to only those consumers that need it at the moment, while TDM statically allocates bandwidth in fixed amounts, removing any possibility for sharing bandwidth.

Dynamic bandwidth allocation is important because of the bursty and intermittent nature of voice and data. Because speech conversations are typically active in only one direction at a time, only about 50% of the full-duplex voice bandwidth is used at a time. Similarly, data traffic often consumes only 20% to 50% of its allocated bandwidth. With FPM, further reductions of 50% to 75% are often seen, giving an overall bandwidth reduction closer to 5% to 10% of the original requirements.

The effects can be dramatic. With compression and FPM techniques, a T-1 can carry 320 voice channels or 160 fax channels. Even a 128K bit/sec fractional T-1 line can carry 16 to 24 voice channels. In fact, a 64K bit/sec circuit can now carry integrated voice, data, fax and LAN traffic, for which you had to use T-1 in the past.

By combining voice, data and video compression with automatic fax demodulation and FPM, most T-1 users can forestall jumping to T-3. The same technology trio also turns 56K/64K into a miniature T-1, forestalling the need for T-1 and bringing integrated voice and data private networking to the rest of the corporate world.

Pro

continued from page 27

jects uncertainty into the T-3 evaluation process. Users need to know if the tariffed cost will be less or more expensive than costs offered by individual carriers. It might be better to delay purchases in hopes of getting a better deal once T-3 services are tariffed.

This uncertainty has led to delays in the decision-making process. Thus the explosive growth predicted for T-3 in 1989 and 1990 has yet to materialize.

Despite the uncertainty with tariffs, as bandwidth-intensive applications increase, so too will the demand for T-3. The resulting competition among carriers for this lucrative business will drive costs down.

Voice applications were the primary driving forces in the T-1 market boom, and several promising bandwidth-intensive data applications will do the same for the T-3 market.

The large data traffic volumes associated with on-line applications and local-area network interconnections are likely candidates.

Likewise, route diversification requirements for disaster recovery plans, imaging applications and the renewed interest in videoconferencing for business applications and remote monitoring for security systems will also drive the market.

The technology to implement these applications exists today, but it is cost-justified only by large corporations. These include high-volume data users with broad bandwidth requirements, such as financial institutions and credit card companies. These industries are presently studying the economics and feasibility of using T-3 networks. At the same time, however, they are keeping an eye on one another to learn the intentions of their competitors.

This competitive positioning is like a marathon race in which the runners are packed together for the first few miles. Eventually,

> An indication that network users need T-3 capability is the rapid changes in world politics and economies.
>
> ▲▲▲

when the strategic moment presents itself, one or two runners pick up the pace, putting as much distance as possible between themselves and the rest of the pack.

Similarly, within the next few years, a major bank or financial institution seeking a competitive edge will implement an application such as check imaging in an effort to break away from the pack. An application such as that increases the bandwidth requirements throughout the network. Remote branches could implement T-1 or fractional T-1 at the access portion of the network to obtain the bandwidth needed to support these new applications, which in turn means the backbone portion of the network will require more capacity — a T-3 line.

Another indication that network users need T-3 is the rapid changes in world politics and economies. Business is now more global in scope than ever before. The European Community of 1992 and the growth of multinational organizations will increase the demand for information networking capabilities. Logically, these events will only serve to increase bandwidth requirements.

The subsequent aggregation of traffic to reduce costs has always been a driving force in the communications industry.

Many users already use T-1 and fractional T-1 lines to transmit voice, data and video traffic across both the Atlantic and Pacific oceans. Increased business activity in other countries, much of it at 2M bit/sec, and the corresponding increase in communications traffic will soon begin to tax existing corporate backbone networks.

Economic factors, technological advances and world political and business events are moving too rapidly for T-3 to stay on a back burner for long. Therefore, users should plan for and migrate to T-3 as soon as it's needed. The opportunities will present themselves on a link-by-link basis, and the economics will justify the change.

Letters

continued from page 27

ing an exam. As the CNE program matures and new technologies become available, I hope the program is altered to include the appropriate requirements. If the technology is not stagnant, why should the certification requirements be?

Over the years, I have come across a number of clients who have engaged incompetent vendors and consultants to design, install and support their networks. The question is: How does anyone tell the good guys from the bad? Novell's CNE program is an attempt to train and qualify support personnel in networking technologies. I applaud Novell for trying to protect their end users by offering the CNE training program. Novell does not view the CNE program as a "money-making opportunity" — just the opposite. Organizationally, the program is under Education and Support Services, not Sales.

Stuart Pastman
Partner
The Matrix Organization, Inc.
Berwyn, Pa.

THE BEST READ MOST IMPORTANT MOST USEFUL Networ

NETWORK WORLD
The Newsweekly of User Networking Strategies
Volume 7, Number 18 | An International Data Group Publication | April 30, 1990

U.S. to study Soderblom token patent

By Laura DiDio
Senior Editor

WASHINGTON, D.C. — In a move that could spell trouble for Olof Soderblom's token-passing patent and monetary relief to his 50 licensees, the U.S. Patent and Trademark Office has agreed to reexamine the validity of Soderblom's patent.

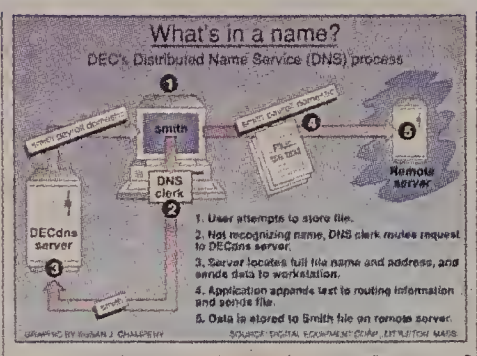
In its 1½ page decision, the Patent Office stated that the reexamination request from an anonymous vendor was granted in view of earlier patents issued to four engineers — including two from AT&T Bell Laboratories — before Soderblom was granted his patent in 1981.

"A substantial new question of patentability affecting Claims 23 to 33 of U.S. Patent No. 4,493,948 to Soderblom is raised by the request," the Patent Office statement said.

The 10 claims in question deal with open and closed data transmission loop schemes and are central to the issue of whether Soderblom's existing patent is applicable to today's token-ring and Fiber Distributed Data Interface local-area network technologies.

Invalidation of the patent or amending even portions of the patent could effectively render null and void the current licens-

(continued on page 62)



DEC describes benefits of X.500 directory services

X.500 will extend DNS offering to incorporate non-DEC devices in DECnet Phase V directories.

Q&A Later this year, Digital Equipment Corp. is expected to announce DECnet Phase V, a major revision of its network software that will support the full suite of Open Systems Interconnection protocols.

According to Jane Brewer, DEC's product marketing manager for enterprise networking within DEC's Telecommunications and Networks Organization, one key component of that announcement will be support for the X.500 directory services standard, which promises to give network administrators greater control over the hardware and software elements in their networks.

In an interview with *Network World* Assistant Managing Editor Charles Bruno, Brewer described the full potential of X.500 directory services and laid out DEC's strategy to support the technology within DECnet Phase V.

(continued on page 59)

Microsoft to market LAN Manager direct

Software giant to sell NOS to Compaq resellers to stabilize LAN Manager camp, jump start sales.

By Laura DiDio
Senior Editor

REDMOND, Wash. — In an attempt to boost lagging sales of its LAN Manager network operating system, Microsoft Corp. last week announced it will sell a version of the product directly to select Compaq Computer Corp. value-added resellers.

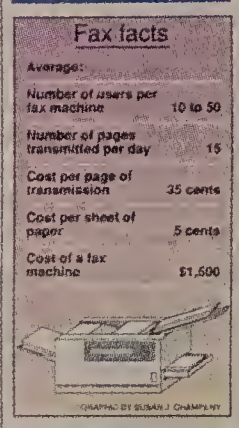
Microsoft's decision to put its marketing muscle directly behind LAN Manager is viewed as crucial if the product is to compete successfully with Novell, Inc.'s NetWare, which commands 60% of the network operating system market today. LAN Manager has only been available through OEMs to date.

"By selling its own version of LAN Manager, Microsoft is giving users freedom of choice," said Craig Burton, executive publisher of the *Clarke Burton Report*, a monthly research magazine. "Users will no longer be constrained to buying versions of the product that only work with a particular OEM's hardware. This will help accelerate the acceptance of LAN Manager."

Jonathan Yarmis, vice-president of the personal computer service at Gartner Group, Inc. in Stamford, Conn., agreed. "The move solidifies and stabilizes the LAN Manager camp and will spur application development.

"Microsoft and its OEMs have to present a unified front, especially in light of Novell's merger

(continued on page 6)



Net execs try to tame fax monster

By Tom Smith
New Products Editor

The explosive growth of facsimile machines has created a costly monster of which few companies are aware, let alone able to control.

Most large companies don't even know how many fax machines they have or how much they are spending on dial-up fax transmissions.

"It's like trying to manage envelopes or pieces of paper," said Bob Craig, vice-president of international network planning for The Chase Manhattan Bank, N.A. in New York. "People don't think it's worth the cost of managing it."

Yet the costs can be staggering. Annual transmission costs can be in the tens of millions of

(continued on page 8)

NETLINE

AT&T TRIDOM plans to trial a pan-European VSAT network with two users. Page 2.

A TARIFF IS USER is the loser in a heated battle between MCI and AT&T. Page 2.

VENDORS AIMING for FDDI interoperability form a testing consortium. Page 2.

3COM ELECTS Benhamou to the post of president. Page 4.

AMEX AWARDS MCI with a service contract that could be worth up to $100m. Page 4.

US SPRINT EXTENDS VPN services into international markets. Page 4.

PRIVATIZING TELECOM in Eastern Europe is a question of capital. Page 43.

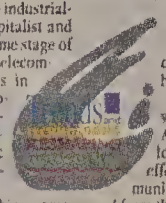
NEWSPAPER

FEATURE

Telecom privatization will aid int'l users

By Norman Lerner
Special to Network World

Most countries — industrialized, developing, capitalist and socialist — are at some stage of restructuring their telecommunications systems in order to accommodate and take advantage of the great political and economic changes now sweeping the globe.



In many places, this restructuring is taking the form of privatization of formerly nationalized telecommunications systems. This important trend raises major questions for multinational users of telecommunications services, including: Where is this happening and why? How will it affect the way we do business? And what will be the long- and short-term effects on telecommunications services to and from these countries?

This article examines the trend toward privatization in

(continued on page 38)

The results are in and **Network World** is the clear leader. The 1990 Wall Street Journal/ICA Member Study is conducted among members of the prestigious International Communications Association (ICA), an organization whose representatives purchase $16 billion of information technology products and services each year.

Since **Network World** began in 1986, we've maintained a singular focus: to be the most useful source of information for users involved in multivendor, multisite enterprise networks and, in doing so, provide the most value for our advertisers.

Other publications focus on vertical technologies - or worse yet - relegate networking to a single section.

But network executives, responsible for managing multivendor enterprise networks, demand more.

And they read **Network World** because we focus on the total picture by reporting on every facet of the enterprise network - from departmental LANs to global networks.

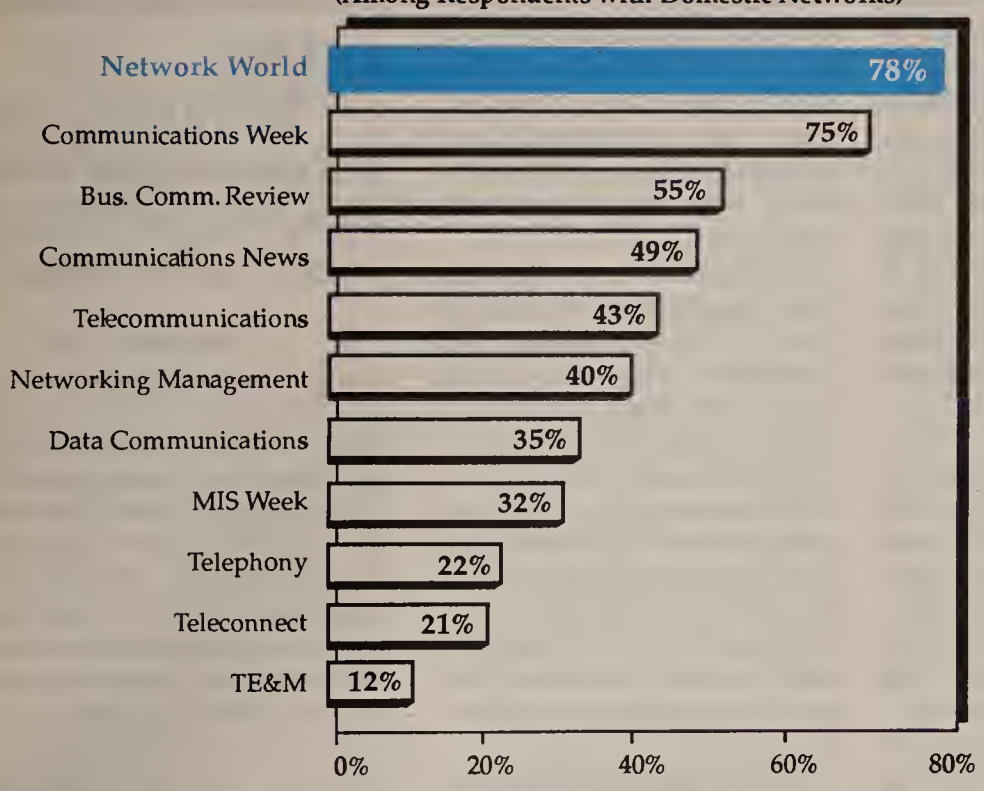
Thanks ICA for helping us prove once again that if you want to reach the professionals who control the network destinies of America, the people who buy networking products and services in volume for their enterprise, the best place to advertise is **Network World.**

Where the network world gets its network news.

ing Publication In America

Domestic Regular Readership

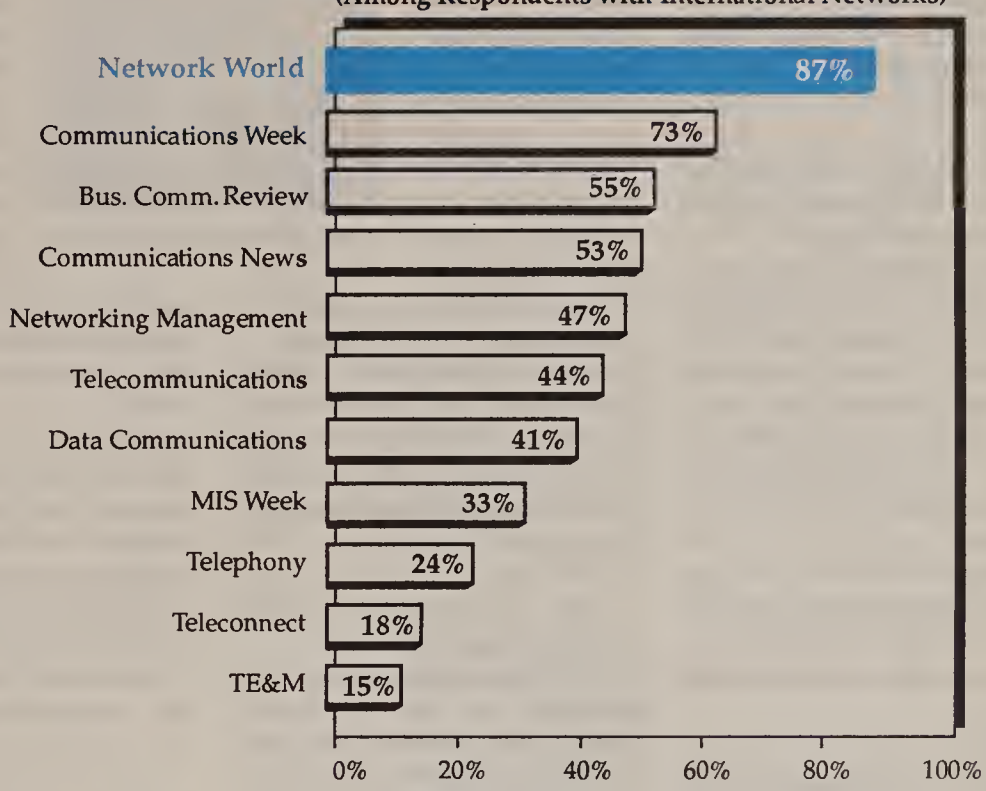
(Among Respondents with Domestic Networks)



Base: 336 Respondents
Regular readership is at least three out of four issues.

International Regular Readership

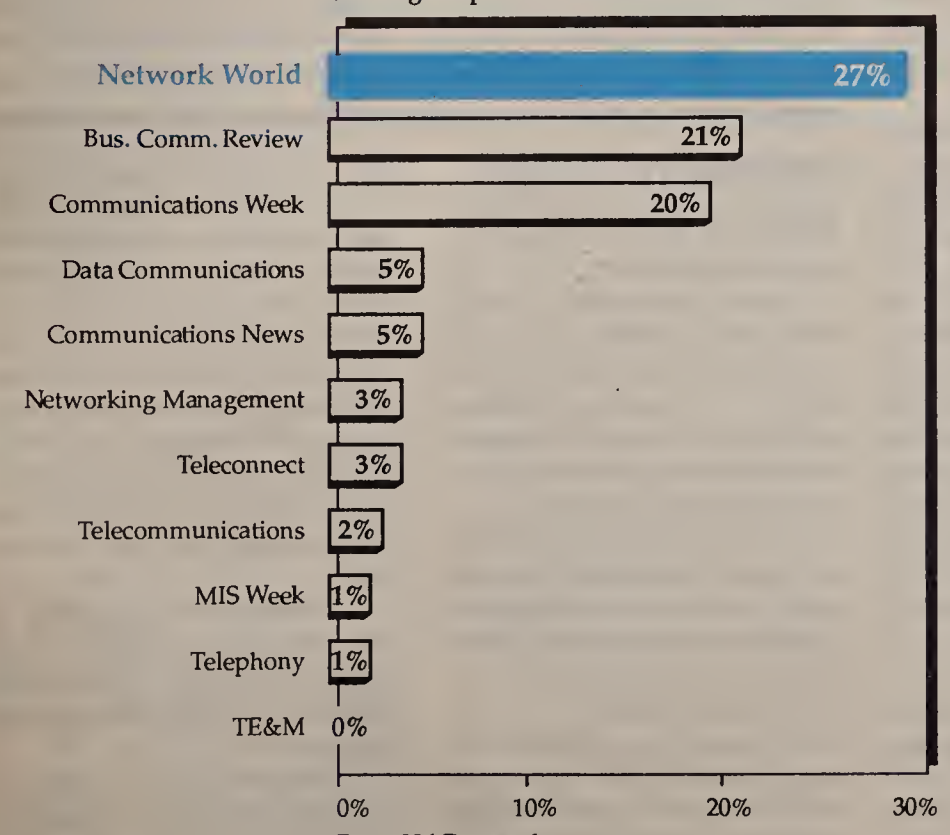
(Among Respondents with International Networks)



Base: 165 Respondents
Regular readership is at least three out of four issues.

Domestic Most Important/Useful

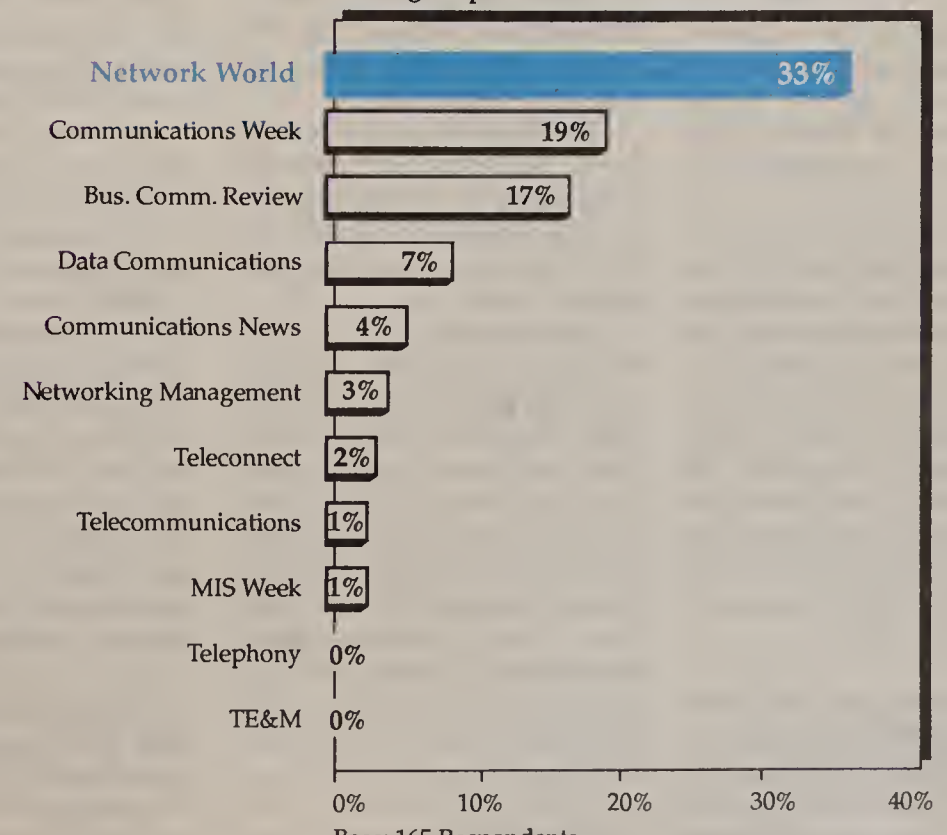
(Among Respondents with Domestic Networks)



Base: 336 Respondents

International Most Important/Useful

(Among Respondents with International Networks)



Base: 165 Respondents

Source :1990 Wall Street Journal / ICA Member Study

DEC shares early DECnet V lessons

continued from page 1

Phase V migration effort, including some of the economic trade-offs users will face.

What is the first thing users should do when looking to migrate to Phase V?

Anybody that is going to migrate to Phase V needs to do thorough planning. Depending on the size of the network and the company's organizational structure, users are probably going to need a team of people representing the different organizations that make up the network.

A network manager may take a look at Phase V and say, 'This is great. I've got all these new bells and whistles.' But in most cases, it's imperative that people make a good business case for why they are [migrating to Phase V]. That is important because, at some point, you have to justify this to management because there is some cost to it.

What have you done so far in terms of physical implementation of Phase V?

We took three DECnet areas [basically subnets within DECnet that support as many as 1,024 nodes each] at three engineering sites directly involved in Phase V development [and set them up as] a test network, although it's still a part of the whole DEC Easynet environment.

We've got one area in Reading [England], where the routers are

> "It's imperative that people make a good business case for [migrating to Phase V]."
>
> ▲▲▲

developed, one in Littleton, Mass., where most of the communications and network people are, and one in Nashua, N.H., where the VMS engineering people are.

These Phase V systems can communicate with one another, but they can also communicate with the rest of the network. This lets us test Phase IV-to-Phase V compatibility. The subnetwork — we're calling it T-net for Transition network — has over 200 systems, and at least 30 or 40 are running Phase V today. Over the next two quarters, we'll get Phase V systems up in the main part of Easynet.

Is anything live on T-net, or is it still being tested?

It's still being tested. To get to the point where we have order processing, inventory management or something like that is probably a minimum of six months away. One of the things holding us back a bit is the fact that we don't have all the products. We have DECnet on Ultrix. We have the [DEC Management Control Center] network management products. We have routers running Phase V on T-net, but we still don't have Phase V on VMS outside of the engineering development sites.

What Phase V features are implemented on T-net?

At this point, we have [DEC Distributed Name Service] name servers. We do not have [DEC Distributed Time Service] time servers, at least not in a comprehensive way. We might have some that are installed, but it's for testing.

DEC's Robert McCauley

What do you think users should be looking out for?

The name service is something I think needs to be carefully addressed. A name service is used by some applications in a Phase IV environment, but in Phase V, it becomes a much more critical piece of the network. We had questions about how many name servers to use, what types of platforms they should run on and access control.

How will you implement the name server?

We're planning a hierarchical approach. We have dedicated name servers at most sites. A lot of them are based on MicroVAX systems. The strategy is to have at least two servers at any reasonably sized site so there is some backup. So we actually have about 200 of what we call site servers.

At the second layer, we've begun to implement superservers. At this point, there are two or three of them. We figure that over a two- or three-year period, we might go as high as 20.

The idea is for superservers to keep a master copy of names and node addresses. At this time, we are not using the auto-configuration and auto-registration features of Phase V.

We're using the same process we've had in place for a couple of years. [DECnet] area registrars enter registration information. After verification, [the information] gets entered into a master data base. We have a file-transfer environment that rolls that data base out to maybe 30 or 40 machines. Each of them cascades it down to other machines. We feed changes made to this master name server to the rest of the network once a day.

Why is the name server so important? Is it because it translates simple names entered by users into physical node addresses, instead of forcing them to enter the cryptic commands they need to know today?

Yes. And it does that for anybody on the network. It's not like VMS logicals that would do that for you on a particular system right now. This is really network-wide translation.

If you dedicate processors as name servers, won't customers have to buy more machines?

That's hard to answer because while some capacity for the name server is needed, in many cases, it is offsetting other capacity that was being used before.

In Phase IV, there is capacity being used on all those end systems as they copy the file. It is not clear to me what the net effect is on resources. It is also not clear — and I guess this is something that will be specific to each customer — what the incremental cost of the hardware would be in a particular case.

In our situation, we've somewhat arbitrarily said these superservers are something we wouldn't need without Phase V. We're justifying them and considering them a cost of migrating to Phase V. With the site servers, we're taking the position that they would be needed anyway.

Are you saying there is a naming service in Phase IV that chews up some processing power but that the new name service will chew up even more?

Yes. What makes it a little more difficult to understand is that in the Phase IV environment, it really wasn't called a name service. The resources were being used, but they were sort of in the overall DECnet process.

On the one hand, you look at Phase V and you see something like DECdns, and it looks like a total incremental requirement. But I don't think it is.

This is one of the things we hope to learn as we install Phase V within Digital. We want to get a feel for what the incremental cost is, what the right configuration is for some of these services and what the performance trade-offs are. In some ways, our strategy to use dedicated MicroVAXes for name servers is overkill, but it gives us a safety margin.

Can name servers also run on a VAX running other applications?

It depends. It really comes down to a question of capacity. Initially, some sites will run the name service on a machine used for other things, and that will be fine. Or maybe they will have one dedicated MicroVAX as a primary server and their backup machine will be a time-sharing system.

Over time, as their load grows, there will be two choices: go to a bigger VAX and continue to run all those applications on one machine, or dedicate a machine for the name service. Our strategy has been to use dedicated machines because we think it gives us some ability to tune them for that particular use. One of the things we're doing to make that more palatable is envisioning that these dedicated machines will run other Phase V services like time service.

Are there any other elements of Phase V that will force customers to upgrade their CPUs?

That is hard to generalize. I'm not making blanket statements, but there is another area that we have looked at that ties into capacity planning. Phase V has larger addresses and generally more overhead, so we're interested in seeing what happens to circuit utilization.

We figured that, in the worst case, it could be a 20% degradation in circuit performance. But that doesn't mean every circuit has to be upgraded. What it means is that you really have to look at different circuits and see if 20% is going to put you in a saturated position and, if so, what do you want to do about that. We don't know in a typical situation what you will really experience, and that is one of the things that we will be looking at on T-net.

Given that addresses are longer and packets are larger in Phase V than in Phase IV, will you recommend that users upgrade to more powerful routers?

We do have some recommendations, but for the most part, we don't see any change in our strategy of using DECrouter 2000s as the preferred approach. We do expect some degradation in throughput, at least in the first version of Phase V routing software.

Does that have to do with the overhead?

That's right. We're not concerned about that at this point because we're not driving any router at capacity. We believe that our router people will come out with new releases that will optimize and increase throughput.

We also look at what some other companies have in the market. Depending on how our traffic grows, we'd love to see a DECrouter 2000 drive more than one T-1 line [which it can't do today].

You're using DECrouter 2000s. But some customers need the multiprotocol and multi-T-1 link capabilities other vendors offer. Are you doing anything to test how other vendors' routers will operate in the Phase V world?

> "We'd love to see a DECrouter 2000 drive more than one T-1 line [which it can't do today]."
>
> ▲▲▲

At this point, I don't think we have anything that addresses that. [But] there is a lot going on within our company to come up [with more competitive] routers. We have joint development plans with StrataCom [Inc.] and have made some of our protocols available to companies like cisco [Systems, Inc.] and Wellfleet [Communications, Inc.].

There is a desire to work with companies like that or figure out how to coexist with and leverage off of one another. So what you're suggesting might be something that people in the company might be looking at. T-net or Easynet would be a place where we could get some good data.

Software helps detect problems

continued from page 23

This is important in DECnet local-area networks, which send out 64-byte hello messages every eight to 15 seconds, Witkowicz said. Large networks can generate enough hello messages to cause a broadcast storm.

In a network with 1,000 DECnet nodes, for example, the messages could generate 34K bit/sec of traffic and sap up to 60% of the available bandwidth of a 56K bit/sec bridge link.

To prevent this, the new software will store these messages in a 500K-byte buffer and send them when data traffic is low, and they will not be taking up bandwidth that could be used for data transfer. Users can also specify a maximum length that messages will be held in a queue, after which they will not be transmitted.

The ability to prevent broadcast storms is currently only supported on the ILAN bridges and not the HSB bridges. This is because ILAN bridges are offered in remote versions and the current HSB offerings are local bridges only.

Current users can upgrade to the new software for $500. As of today, all new CrossComm bridges will be shipped with these functions.

CrossComm can be reached by writing to P.O. Box 699, Marlborough, Mass. 01752, or by calling (508) 481-4060.

Plodding CCS7 delays services

continued from page 1

formation, a New York-based market research firm that recently issued a report titled "Intelligent Networks and SS7."

Bell Atlantic Corp. and BellSouth Corp. are each expected by year end to support more than half of their access lines from CCS7-equipped switches, which is twice as many as any other RBHC, she said.

The RBHCs are also becoming increasingly active in interconnection trials with long-haul carriers, which should lead to commercially available end-to-end advanced services next year.

Among the trials taking place this year is an Integrated Services Digital Network trial ordered by the New York Public Service Commission in which AT&T, MCI Communications Corp., New York Telephone Co. and others are expected to participate.

Another is an ISDN interconnection trial, which is scheduled to get under way next month, involving Bell Communications Research, BellSouth, Southwestern Bell Corp. and the Big Three long-haul carriers.

Service foundation

CCS7 is important to users because it is the key underpinning for ubiquitous ISDN offerings and other intelligent net capabilities such as 800 data base services and local virtual networks.

In essence, CCS7 involves the installation of special packet-switched networks used to route call signaling information between carrier switches. The out-of-band signaling nets make it possible for the switches to do things such as query data bases or other switches, capabilities fundamental to the advanced services.

Users and analysts acknowledge that the RBHCs have become more aggressive in their CSS7-related activities, but not aggressive enough.

"[CCS7] deployment by the Bells has been spotty," said Bob Hoss, vice-president for planning and engineering of worldwide telecommunications at American Express Travel Related Services Company, Inc., in Phoenix. "We'd like to see [CCS7] deployed faster. We're a big ISDN user now, but we'd be a lot bigger ISDN user if we could get ISDN interconnection nationwide."

Brian Moir, counsel to the International Communications Association, a group of the nation's leading corporate network users, agreed. "Our sense is that [CCS7] deployment by the Bells has been amazingly [slow]."

Incentives

The RBHCs have lagged behind their counterparts in the long-haul industry but are picking up the pace because, like the long-haul carriers, "they are realizing that [CCS7] can help them more efficiently use their networks and provide more advanced services," said Gerry Mayfield, a vice-president at DMW Group, Inc., a Stamford, Conn.-based consultancy.

"But they have some catching up to do," he said.

Altogether, the RBHCs are expected to spend about $4 billion over the next seven or eight years to buy and install the equipment needed to support CCS7, said Steve Sazegari, a telecommunications analyst at Dataquest, Inc., a San Jose, Calif.-based market research firm. That number could double when the cost of implementing software to support services — such as ISDN — on top of SS7 is included, he said.

RBHC executives said the high cost of deploying CCS7 is one reason that the technology has not been implemented as fast as some would like. Another reason is that deploying CCS7 involves the construction of complete overlay nets, they said.

"A lot of people have overlooked that we're putting in a new network infrastructure," said Bruce Johnson, staff director for signaling at Nynex Corp.'s Nynex Service Co. in White Plains, N.Y. "The network is not going to evolve into a [CCS7] network overnight."

Gerry Canavan, director of enabling technologies at US Sprint Communications Co., said he would like to see the RBHCs move faster with their CCS7 deployment and interconnection to the long-haul carriers' CCS7 nets but he sympathizes with the RBHCs.

"The RBHCs are really starting from scratch," Canavan said. "They haven't even deployed digital switches everywhere."

Users, however, are not so understanding.

"I'm not encouraged by the general rate of [CCS7] diffusion by the RBHCs, and I'm particularly concerned about the lack of [CCS7] interconnection between the RBHCs and the long-distance carriers," said Michael Corrigan, assistant commissioner for telecommunications services within the General Services Administration. Corrigan has responsibility for long-haul service to 1.2 million government employees and for local service to about 500,000 government employees.

"I think the interconnection trials between the RBHCs and long-distance carriers are a step in the right direction," Corrigan said. "I just wonder how soon those trials will lead to the availability of the end-to-end switched digital services we want to use."

The local and long-distance carriers need to work out a number of interconnection issues that include CCS7 network maintenance and making sure everyone has "interpreted the [CCS7] standards the same way," said Richard Campbell, product manager for ISDN and CCS7 within AT&T's Business Communications Services Division.

"We're ready to hook up as soon as any local exchange carrier files a tariff," he said.

US Sprint's Canavan said he is hopeful that his company will be able to offer end-to-end services supported by CCS7 between some major metropolitan areas next year. "It will be '92 or '93 before there is significant coverage."

Congress warns against change

continued from page 1

the smoke hasn't cleared [on previous regulatory changes] and yet new guns are being drawn on existing regulation," Markey said.

Sikes said he would provide Congress with any information it wants about the regulation of long-distance or local carriers, but he refused to promise that the FCC would wait on new reforms until Congress is satisfied that AT&T's price cap plan is working.

"You ask me to say that we will not do A until we have done B, and I think that would be irresponsible," Sikes said.

If concern grows over the FCC's handling of major proceedings, it's possible that lawmakers could intervene and try to stop or modify the FCC's proposed rule changes.

Congress stepped in during former FCC Chairman Dennis Patrick's tenure, preventing the FCC from implenting price cap regulation for local carriers while doing so for AT&T.

A chill in relations with Congress could also derail efforts to transfer oversight of the Modified Final Judgment from the court to the FCC.

Sikes told the subcommittee that the FCC is moving ahead with the proposed regulatory changes at a reasonable pace and it has done everything possible to collect necessary information. Sikes said he voluntarily opened a second round of comments on the price cap plan.

He said the commission is still collecting information regarding the loosening of restrictions on AT&T but charged that a comprehensive reassessment of AT&T's regulatory status is needed to short-circuit ad hoc deregulation through the tariff process.

But some members expressed concern that Sikes is proceeding without giving due consideration to all sides of the issues. They also grilled Sikes as to whether he is taking into account recent information about the telecommunications industry.

Several congressmen said they were troubled that Sikes wants to deregulate AT&T at a time when US Sprint Communications Co., the third largest carrier in the country, reported a second-quarter loss of $42 million.

"[The subcommittee] hopes the FCC knows what it's doing," said Rep. Jim Cooper (D-Tenn.). "So much of your testimony is a sales pitch. It makes me think you've already made up your mind and you're just laying the groundwork for that decision."

Referring to the scheduled January implementation of price caps for local exchange carriers, Cooper said, "I wonder if the magic date of Jan. 1 is important when you're risking making a multibillion mistake."

Rep. W.J. Tauzin (D-La.) questioned whether the agency had enough evidence to back up the changes it wants to make. "Is it the right time to turn AT&T loose when, in some cases, competition seems to be shrinking rather than growing?" he asked, referring to recent mergers among carriers.

Rep. Michael Oxley (R-Ohio) said he was generally supportive of the FCC's efforts to improve regulation but questioned whether the FCC is considering all of the facts about lessening AT&T's regulation. Oxley said AT&T has 65% of the long-distance market and "clearly 65% of the market is a dominant situation"

The hearing followed on the heels of a move by Congress to examine the FCC's effectiveness in protecting consumers. Late last month, Markey and Rep. Mike Synar (D-Okla.) asked the General Accounting Office to investigate whether the FCC has the resources to police the industry adequately.

A report in 1987 stated the FCC couldn't guarantee protection for consumers against cross-subsidization.

Earlier, a coalition of 36 consumer and users groups, state officials and carriers lodged a complaint that the FCC is ignoring concerns on price caps.

Firm outsources DP, SNA net

continued from page 1

tation as a leader in the emerging outsourcing market, which is expected to top $50 billion annually by 1994, said Howard Anderson, managing director of the The Yankee Group, a market research firm based in Boston. Andersen established its outsourcing practice three years ago, according to a company spokesman.

The Sun Refining-Andersen deal was announced at a two-day outsourcing conference here sponsored by The Yankee Group.

The two companies have signed a letter of intent and are currently negotiating details of the contract, which should be signed sometime this fall, according to a Sun Refining spokesman.

Sun Refining is the largest subsidiary of the $11 billion Sun Co. Besides its five refineries, the subsidiary owns and operates 6,500 retail outlets throughout the U.S., including Sunoco and Atlantic gas stations and food markets.

A major reason Sun Refining decided to outsource was because it had excess processing capacity at its Dallas data center and wanted to reduce operating costs, according to Jack Donohue, director of information systems (IS) at Sun Refining.

In 1988, Sun Refining sold its oil exploration and production unit, a move that cut processing volume on its four mainframes by 40% and significantly reduced traffic on its SNA network, Donohue said.

"We had extra capacity and people," he said. "We thought an outsourcing firm such as Andersen could sell the extra capacity to other companies while helping us reduce our costs."

The deal will also give Sun Refining some extra capital from selling its data center and equipment, valued at about $15 million, according to the spokesman.

Sun Refining will continue to manage local-area networks used in its offices as well as a number of Digital Equipment Corp. DECnet networks, which support the firm's distribution and loading centers throughout the country, Donohue said. He added that Philadelphia National Bank will continue to run Sun Refining's point-of-sale network for its retail outlets.

Sun Refining will also maintain direct responsibility for application development and data base management as well as non-SNA network technologies. Sun Refining IS and network staff will drop from 450 to about 380 people, all located in Philadelphia, once the deal is completed, Donohue said.

Sun Refining joins several other petroleum companies that have already announced outsourcing contracts.

This spring, Chevron announced it was outsourcing its POS network to Hughes Network Systems, Inc. and its backbone data network to AT&T. Other energy companies that have recently announced outsourcing deals include Enron Corp., Freeport-McMoRan, Inc. and Oryx Corp., a former Sun Refining unit.

Sun Refining considered bids from IBM and Affiliated Computer Services, Inc. of Dallas before giving the nod to Andersen, the Sun Refining spokesman said.

According to Donohue, Andersen made an attractive financial offer that closely met Sun Refining's needs.

The deal was also a big coup for the consultancy, which had yet to land a major outsourcing contract, Yankee Group's Anderson said.

"The [Sun Refining] deal vaults Andersen Consulting into the top tier of outsourcing vendors, which include IBM and Electronic Data Systems Corp.," Anderson said.

Gov't preps nets for GOSIP

continued from page 2

government's job of integrating computer systems and networks from different vendors. Defining the set of standards the government wants — and that industry can deliver in terms of products — has been a six-year effort between NIST, vendors and government users in the NIST Workshop for Implementors of OSI.

The three versions

GOSIP, outlined in the NIST Federal Information Processing Standard Publication 146, was approved by the Secretary of Commerce in August 1988.

The first version, which goes into effect next week, mandates that agencies considering file-transfer or electronic mail products must buy those that conform to GOSIP's File Transfer, Access and Management (FTAM) specification and the X.400 Message Handling System (MHS).

GOSIP Version 1 also stipulates requirements for wide-area and local-area network products, calling for use of the CCITT's X.25 packet network standards and IEEE 802.3 Ethernet, 802.4 token-bus and 802.5 token-ring LAN standards.

Jerry Mulvenna, head of the network applications group in NIST's Systems and Network Architecture Division, said GOSIP Version 2, planned for September release, will require vendors to support GOSIP's Virtual Terminal Service, Office Document Architecture, Integrated Services Digital Network, End System-Intermediate System protocol and, as options, the Connectionless Transport Service and the Connection-Oriented Network Service.

Version 2 is scheduled to go into effect 18 months after the document is released.

Version 3, now being planned, is expected to include directory services, transaction processing, electronic data interchange and Fiber Distributed Data Interface.

Although GOSIP mandates compliance with standards, it leaves the method of compliance up to the individual agencies, according to Harold Folts, president of Vienna, Va.-based consultancy Omnicom, Inc. Omnicom is providing OSI training to government agencies and vendors.

Folts said users can implement GOSIP using a gateway approach, providing a means of linking non-OSI products into an OSI environment; using dual-protocol stacks, implementing full OSI and non-OSI protocols on each network device and enabling the machine to use the protocols appropriate for any given job; or using mixed protocol stacks, layering upper-layer OSI protocols and applications above non-OSI lower-level protocols, or vice versa.

GOSIP leaders

But success in following the GOSIP mandate — knowing when, what and how to buy new network products — may largely depend on clear directives from top-level government entities. The Department of Defense and the Department of Energy have emerged as GOSIP leaders.

The Defense Department has supported GOSIP since 1987, when it declared OSI to be a co-standard with its Transmission Control Protocol/Internet Protocol, which originated as a military standard.

In 1988, the Defense Communications Agency, acting for the Defense Department, completed the OSI Implementation Strategy, which established a schedule for GOSIP implementation.

The Department of Defense wants to be using advanced OSI capabilities, such as X.500 Directory Services, Intermediate System-to-Intermediate System routing protocols, and full network management and administration by October 1991.

Detailed transition strategies are also being finalized by the Army, Navy and Air Force.

The Navy, for example, has been using its OSI lab to perform tests in preparation for transition to GOSIP, said Deborah Adams, computer specialist with the Navy's Information Resources Management (IRM) Architectures and Standards Group.

In what it calls a dual-suite host strategy, the Navy has drafted plans to establish application-layer gateways in seven Naval Regional Data Automation centers around the country in order to allow file-transfer and E-mail interoperability between hosts that use different protocols.

The Department of Energy has gained a reputation in both the public and private sector as the earliest nonmilitary organization to recognize the need for preparing for the GOSIP transition.

According to Thomas Rowlett, the Energy Department's coordinator of the OSI transition, because of high-level management support, the department has been able to create its GOSIP Migration Working Group, consisting of about 40 people from the general counsel's office and procurement, policy, IRM and technical divisions throughout the country. The group was established in April 1989.

An Energy Department GOSIP policy statement and a GOSIP transition plan are soon to be released, Rowlett said. Although widespread knowledge about GOSIP now exists at all levels of the department, he said, there is also awareness about the demands the GOSIP transition will make. Rowlett said the Energy Department's staff currently does not have the expertise necessary to integrate OSI into the department's existing technology, though he added the situation is improving.

But Rowlett noted that the Energy Department, like much of the government sector, is contractor-oriented. The government will be calling on vendors to handle much of the technical work, he said.

In fact, NIST published the *GOSIP Users Guide* in 1989 that suggests that agencies work with vendors to build transition strategies.

It's worth it

Full network interoperability through conformance of standards will not come until 10 to 20 years from now, Folts said.

But no matter what the difficulties, the effort is worth it, said Jason Canon, communications manager at the Department of Treasury's Office of Telecommunications Telemanagement for Network Programs.

"It's going to be a real challenging task," Canon said. "But it [will be] wonderful to have a nonproprietary standard to move information without constraint."

NetWare for Mac ups bridging

continued from page 2

incorporates a complete Macintosh-to-token-ring solution and gives Macintosh users continued seamless integration with the NetWare environment," said Robert Wohnoutka, acting director of marketing for Apple's networking and communications products division.

The new AppleTalk Phase II support allows Macintosh clients to communicate for the first time with a NetWare server across a token-ring (4M or 16M bit/sec) net since Apple's TokenTalk would not work under Phase I.

The new Macintosh-based utilities let a network administrator use a Macintosh workstation and its native graphical interface to monitor the network and set up printer queues, user accounts, groups and passwords. In the existing version of NetWare for Macintosh, these administrative functions had to be performed from a DOS-based personal computer on the network.

The new version also does a better job of bridging Macintosh clients to a NetWare 386 server. There is currently no version of NetWare for Macintosh that runs with NetWare 386, so Macintosh users that need to access a NetWare 386 server have to go through a NetWare 2.15 server on the same network.

Steve Nelson, director of product marketing for Novell's Macintosh division, said the existing version had trouble bridging NetWare 2.15 and NetWare 386 because it could not map AppleShare rights and permissions to NetWare 386's rights and permissions. A utility in NetWare for Macintosh 2.0 solves this problem by performing a one-to-one mapping of access rights between the two environments.

Jim Farmer, technology consultant for the Illinois State Board of Education's Educational Service Center in Macomb, Ill., which beta-tested the product, concurs. "We noticed an immediate improvement in server response time," he said. "Messaging between the Macintosh and PC workstations on our net was also a lot faster."

NetWare for Macintosh 2.0, which requires NetWare 2.15c, is expected to be available in September. Users purchasing NetWare 2.15c between now and that time will receive a free upgrade, as will those with a NetWare Assurance contract. Other users of NetWare 2.15 can obtain an upgrade for $200.

FCC pans AT&T discount plan

continued from page 6

AT&T tried earlier this year to get FCC approval for a virtually identical offer, dubbed the Tariff Assurance Policy, that would have applied to any Tariff 15 plan suspended for investigation by the FCC. It would have allowed AT&T to set aside funds equal to the difference between tariffed rates paid by the customer and discounted rates the user would have received under Tariff 15 for the duration of the suspension period.

Amid speculation that the FCC was going to reject the Tariff Assurance Plan, AT&T withdrew the filing and substituted the credits specifically for CBS and La Quinta. Each subsequent Tariff 15 deal contains credits AT&T will pay if it misses the specified installation date.

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $3.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

POSTMASTER: Send Change of Address to *Network World*, 161 Worcester Road, Framingham, Mass. 01701-9172.

OSF seeks open systems tool set

continued from page 5

firm, said OSI-based net management architectures have a better chance of being chosen by OSF. IBM may be a long shot given that its NetView architecture is not based on OSI, he said.

DME holds great promise for users supporting distributed heterogeneous network environments, said John Killion, a senior analyst for telecommunications at McDonnell Douglas Corp.'s McDonnell Aircraft Co. in St. Louis.

"I see DME as being able to limit the amount of manpower we need to support our distributed network at multiple sites," Killion said. "We're supporting more distributed systems and are getting away from mainframe applications. One drawback has been that the number of hours spent on systems support is way in excess of what we would like."

DME would be particularly useful for distributed nets supporting Unix systems, Schay said.

"For Unix systems, there certainly is no useful systems administration in a distributed environment," Schay said. "The systems administration tools that exist are focused on local systems administration rather than distributed administration."

DME could also serve to increase the portability of management skills between vendors' computer platforms, he said.

Jonathan Gossels, OSF business area manager, said it is premature for users to make the OSF's DME a component of their network strategies since products based on DME aren't expected until late 1991 or early 1992.

"There is no technology in the market that I'm aware of that solves all of the problems we're trying to solve. There are only pieces to the solution available," he said. "So it will take some time to put DME together."

OSF will likely receive "pieces to the solution," such as application program interfaces, definitions of managed objects and user interfaces.

A letter of intent to respond to the DME RFT is due Sept. 21, and completed submissions are due Dec. 15. OSF will conduct evaluations and select technologies in the first half of 1991.

ALLIGATORS IN THE SWAMP

Unforeseen problems that can put the bite on your network

Beating RAM cram

By JIM CAVANAGH

"ERROR: INSUFFICIENT MEMORY TO EXECUTE PROGRAM." The screen blinked its ominous green phosphorescent message. Stanley had just finished a grueling local-area network installation and was eager to use the new LAN to allow users to share programs and data files. Stanley's Borland International, Inc. Paradox data base had worked yesterday, before his application programs and data were transferred to the new LAN file server; today, nothing. Was the file server defective? Was the LAN software incompatible with his files and applications? Was the software not shareable? Stanley was perplexed.

The problem he had encountered is a common one: the filling up of the 640K bytes of random-access memory that DOS allots for application programs, or RAM cram. This phenomenon is not new but has recently gained attention due to the widespread use of LANs, which require a portion of that RAM to operate.

Roots of RAM cram

When the first IBM Personal Computer was released in the early 1970s, it had a monochrome monitor, two 320K-byte floppy disk drives and 64K bytes of system memory for use by a *single* user. Around the same time, Digital Equipment Corp., Data General Corp. and other companies were producing minicomputers with operating systems that allowed 64K bytes of memory to be shared by a *dozen or more* users running a variety of applications.

Early personal computer operating systems such as CP/M and PC-DOS and MS-DOS were written to accommodate the phenomenal growth in system memory and disk storage. PC-DOS and MS-DOS, for instance, were designed to allow for growth in memory of up to 10 times the initial 64K bytes of RAM allotted for user applications, for a total of 640K bytes of RAM. In addition, a portion of RAM between 640K and 1,024K bytes, called system or reserved memory, was allotted for use by future devices, such as color monitors.

Applications such as spreadsheet, word processing and data base programs caused personal computers to proliferate. Spreadsheet programs of growing complexity, such as Lotus Development Corp.'s 1-2-3, required increasingly greater amounts of memory. The development and use of LANs exacerbated the memory problem: Gaining the benefits of the LAN required sacrificing some of the personal computer's RAM ordinarily reserved for applications.

RAM cram problems can be solved in two ways: Applications can be made smaller and more efficient, or LAN users can make use of the memory above the 640K-byte limit, which has not traditionally been made available for applications.

Stanley's situation involved two types of users — those who continued to use existing applications, only now on the LAN, and those who were using new applications that were now available on the LAN. Before implementing the LAN, he should have performed a careful analysis of the memory utilization of all of the personal computers that were to become LAN workstations. In this way, he could have determined the LAN implementation's impact on personal computer memory requirements and been better prepared to make changes proactively.

For users performing the same functions on the LAN as they might on a stand-alone personal computer, one solution is to load a terminate-and-stay-resident (TSR) program, such as Borland's SideKick, into available areas of the reserved memory (640K to 1,024K bytes), thereby freeing more of the application memory (0 to 640K bytes) for programs and LAN software. Instead of, or in addition to relocating the TSR programs, the LAN software may be placed into available reserved memory. Many of the special programs that the personal computer needs to access the LAN, referred to as LAN shells or LAN drivers, operate similarly to TSR programs.

The special utility programs that perform the relocation also require memory but far less than LAN driver software or other programs being relocated. The special utility program loads into the application memory area and copies the program being relocated into available reserved memory.

The special utility program then "listens" for requests being made of the relocated program by application programs or by the user from the keyboard and forwards the requests to the program's new location. Most special utility programs are so well written that no noticeable delay occurs as a result of this process. Examples include Valinor, Inc.'s HighStepper, which will relocate any and all TSRs that adhere to the conventions of the DOS technical reference, and LAN Systems, Inc.'s LANSpace, which works with Novell, Inc.'s NetWare LAN drivers.

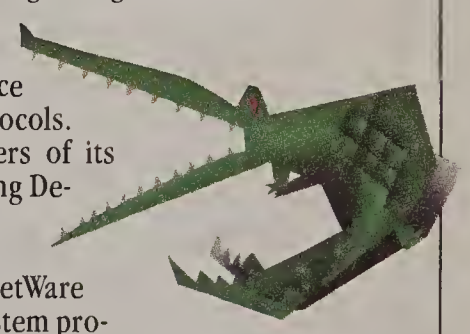
Users encountering problems while trying to use new features made available by the LAN can often avoid RAM cram by choosing LAN utility programs carefully. Many personal computer-based LAN programs, such as Fresh Technologies, Inc.'s PrinterAssist printer-sharing software, will often operate without noticeable impact on the available memory.

However, programs that allow LAN users to access an IBM mainframe, DEC minicomputer or other host resource, are large and memory hungry. It is often beneficial to operate these programs simultaneously with DOS to facilitate data sharing between the host and DOS without requiring the user to sign on and off the host multiple times. This can be done in two ways, both of which are used by Data Interface Systems Corp.'s DI/3270 IBM gateway product.

The more conventional approach is to assemble specialized workstation versions of the host access software that include only the functions each user actually needs. For example, one user may require a single session between the LAN workstation and the host and need only a basic, monochrome 3270 screen. Another user may require three simultaneous sessions with the host and need full-color support, a local DI/3270 menu and use of IBM graphics. Both users may use DI/3270; however, each may have a specially generated version.

The less conventional approach is the zero memory option. The DI/3270 program will allow all active sessions to be put on hold while DI/3270 is not being used. The DI/3270 program may then be completely unloaded from memory, thus freeing all memory DI/3270 had been occupying for use by other functions, such as DOS applications. When the DI/3270 program is again loaded, it looks for sessions on hold and reactivates them at the exact point where they were put on hold, without requiring the user to again log on to the host.

An additional approach allows users requiring multiple LAN protocols to use memory more efficiently. A user may need to use a single LAN interface card to access LAN services requiring different protocols. 3Com Corp. has addressed this problem for users of its 3+Open network operating system by implementing Demand Protocol Architecture, which allows six different protocols to be loaded and unloaded on demand. LAN Systems' LANSpace program allows NetWare users to load and unload the Network Basic I/O System protocol on demand.



Depending on your particular situation, no one product may solve your users' RAM cram problems. For example, Stanley found that a combination of the options discussed above, along with memory management products such as Helix Software Co.'s NetRoom, Quarterdeck Office Systems, Inc.'s Desqview and Softlogic Solutions, Inc.'s Software Carousel, provided a complete solution to the RAM cram problems of his LAN users.

Cavanagh is an Atlanta-based regional application engineer for StrataCom, Inc.

IT'S HARD TO DRAIN THE SWAMP when those reptiles keep getting in the way. To share your "alligator story," call Steve Moore, features editor, at (508) 820-7439, or fax your idea to (508) 820-3467.

With AST, You'll Have A Great LAN Server Today, And It Won't Look Like This Tomorrow.

Premium®486/33TE.
The Upgradeable Computer That Grows To Meet Your Changing LAN Requirements.

What are you looking for in a LAN multiuser server? Expandability. Power. A large selection of off-the-shelf software. Upgradeability to a new generation of processing power. You can get all of this and more with AST's top-of-the-line Premium 486/33TE.

This computer has it all. A 33 MHz i486™ processor. Ten expansion slots with 32-bit EISA capabilities. Up to 2 Gigabytes of disk storage. And perfect compatibility with Novell® NetWare® and other popular LAN operating systems and applications.

But, the best thing the Premium 486/33TE has going for it is AST's patent-pending Cupid-32® technology. With a single, simple board swap, you can upgrade the processor and other speed-related features to support more users on your LAN. So, when new levels of power become available, you don't have to buy a whole new server.

Think of the advantages. Besides saving money, you'll eliminate the need to transfer files, reconnect nodes and reconfigure your entire local area network.

And if you're starting out small, you can buy a Premium 386/33TE computer today and upgrade to i486 power whenever you have the need to support more users or more complicated LAN applications.

Don't get stuck with an antique. For the AST dealer nearest you, call **1-800-876- 4AST** or call our electronic On-Line Technical Information Network at **(714) 727- 4723**.

AST® COMPUTERS

The Power Of Choice.

See The FAXNeT Form on Page #17